NEGOTIATING TECHNOLOGY FRAMES: CONSTRUCTING A CROSS-CULTURAL ENTERPRISE RESOURCE PLANNING TECHNOLOGY IN SOUTH INDIAN MANUFACTURING ORGANIZATIONS

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NEGOTIATING TECHNOLOGY FRAMES: CONSTRUCTING A CROSS-CULTURAL ENTERPRISE RESOURCE PLANNING TECHNOLOGY IN SOUTH INDIAN MANUFACTURING ORGANIZATIONS

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Within the present context of globalization, implementations of Western originated and designed information systems (IS) in non-Western contexts are commonplace. This can create a cross-cultural context, given the IS are embedded with the culture of the social context in which they originate and are designed. An exemplar of such cross-cultural implementation is the global implementation of Enterprise Resource Planning (ERP) software, a packaged business information system. I investigate an under-researched topic in organizational studies: In a cross-cultural context, how do organizations create a working ERP system through the exercise of power? I use grounded theory to analyze eight month-long qualitative case studies of two contrasting manufacturing organizations in South India—a local public organization and a Western private multinational organization. I identify two cyclical processes that actors employ to create a working ERP system: *negotiating technology frames* and *enacting technology frames*. A technology frame, a widely used notion in the IS literature and the Social Construction Of Technology (SCOT) literature, is a cognitive structure that actors use to make sense of technology. I focus on the process of negotiating technology frames to show that cross-cultural ERP software—an embodiment of contrasting norms—is a result of multiple actors shifting technology frames over time in their attempts to impose the frames that embody their interests over others. Thus, in use, a technology frame becomes a sensegiving discursive resource to mobilize and consolidate actors' interests.

Actors combine the exercise of discursive power with the use of coercive means to manufacture a seemingly shared consensus on the sensemaking of ERP software and its modifications. I call this "consensus" *institutional closure*. The "consensual" technology frames are translated into software codes and enacted resulting in organizational changes that lead to the next cycle. In this process, the decisions on ERP modifications are more significantly explainable by negotiators' political interests than by other factors. Highlighting institutional closures, I question the breadth of sharedness of sensemaking, an assumption in organizational sensemaking literature, and contribute to both the SCOT literature and the IS studies. I also develop another novel concept, *technology non-affordance*.

BIOGRAPHICAL SKETCH

George Kandathil is a native of Kerala, South India. He completed his bachelors in Civil Engineering from Mahatma Gandhi University, Kerala. Subsequently, he worked as a lecturer in Civil Engineering. After his short stint as a lecturer, George took masters in Industrial and Management Engineering from the Indian Institute of Technology, Kanpur, India. Subsequently, he worked as a scientist/engineer with Indian Space Research Organization, an Indian equivalent of NASA, for about six years. During this period, he was involved primarily in spacecraft management. In 2004, he joined the ILR School of Cornell University to pursue PhD program majoring in Organizational Behavior. George is married to Twinkle Ann Varghese. They have two children, Maria George and Varghese Kandathil.

Dedicated to those who are oppressed and in need of love.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

A/c: Accounts

AE: Assistant Engineer

AE: Itech Engineer

AM: Assistant Manager

ANT: Actor Network Theory

AO: Accounting Officer

AO: Administrative Officer

APM: Assistant Manager (Plant side)

BIFR: Bureau of Industrial and Financial Restructuring

BOM: Bill Of Materials

CA: Commitment Accounting

CEO: Chief Executive Officer

Cooprn: Cooperation

CPM: Communist Party Marxist

CRM: Customer Relationships Management

DB: Database

DFD: Data Flow Diagram

DGM: Deputy General Manager

DSM: Design and Sales Manager

EIS: Elegant Information System

EJB: Enterprise Java Beans

Engrs: Engineers

ERP: Enterprise Resource Planning

FO: Finance Officer

Formn: Formation

GIS: Geographical Information System

GRN: Goods Receiving Note

HDI: Human Development Index

HOD: Head Of Department

HPD: Head of Project Division

IBM: International Business Machine

ID: Identity

Info: Information

IS: Information System

IT: Information Technology

Ld: Lead time

MD: Managing Director

ME: Mechanical Engineer

Mgmt: Management

MIS: Management Information System

MIS: Manager Information System

MPR: Materials Procurement Receipt

MRP: Materials Requirement Planning

MRPII: Materials Resource Planning

NIEM: National Institute of Event Management

PC: Project Coordinator

PE: Plant Engineer

PE: Production Engineer

PSO: Public Sector Organization

Reprodn: Reproduction

RR: Rejection Receipt

S/w: Software

SAP: Systems Application Products

SC: Sales Clerk

SCOT: Social Construction Of Technology

SE: Senior Engineer

SME: Small and Medium Enterprise

SO: Sales Officer

SRS: System Requirement Study

TF: Technology Frame

TM: Team Member

TM: Technical Manager

TO: Tax Officer

TPB: Time Phased Budget

TQM: Total Quality Management

TU: Trade Union

U.K: United Kingdom

U.S: United States

USD: United States Dollars

VB: Visual Basic

VP: Vice President

Wk: Week

CHAPTER 1

NEGOTIATING FOR A CROSS-CULTURAL WORKING INFORMATION SYSTEM

Contemporary organizations are increasingly choosing to purchase modifiable standard software products rather than build customized systems within their local Information Technology (IT) departments. As Sawyer (2001) notes, the implementation of standard software is different from traditional software or Information System (IS) implementation both because of the nature of the IS development activities and the partnership with the vendors and the implementation consultants. Organizations purchase standard software systems from vendors and ask them or their representatives, namely implementation consultants, to tailor the systems to fit organizations' needs. This fitting results often in customization or modification of the software (Brehm, Heinzl, & Markus, 2001; Glass, 1998).

Conversely, organizations also fit their local needs to the standard software, resulting in adoption of the software without significant modification (Davenport, 1998; 2000; Glass, 1998). Usually, because of the modular nature of many standard software products both adoption and modification occur in a single implementation—some modules or sub-modules of the software are modified while some others are retained (e.g. Wagner, Scott, & Galliers, 2006). Modification results in extra efforts, cost, and time, may times leading to project overruns (Bingi, Sharma & Godla, 2001; Hong & Kim, 2002; Kremers & Dissel, 2000; Markus, Petrtie, & Axlin, 2000; Soh, Kein, & Tay-Yap, 2000). Since the objective of organizations has to be to get a working information system within reasonable time and cost, the choice between modification and adoption may create tensions and negotiations. In this context, my study raises an

empirical question: How do organizations construct a working information system?

The context of my study is the implementation of a modifiable modular standard software, namely Enterprise Resource Planning (ERP) technology. The off-the-shelf ERP software, which I call "standard ERP[1]", contains standard business practices (Davenport, 2000) as they are practiced and taken for granted in Western business contexts. ERP has been labeled as the 'technology of the firm' by popular media (Davenport, 2000). The last half of the 21st centaury has been heralded 'The Enterprise Resource Planning Revolution' (Ross & Vitale, 2000) with enterprise system having been implemented by most Fortune 500 companies (Kumar & van Hillegersberg, 2000). Business leaders, persuaded by the concept of an emerging 'global market place' (see Held, McGrew, Goldblatt, & Perraton, 1999; Castells, 2009), were enamored with the technology's promise to streamline organizational activities, eliminate duplication of efforts and data, and co-ordinate business operations successfully across geographically dispersed locations, even globally (Davenport, 2000; Markus & Tanis, 2000). By 2008, ERP had been implemented in all six continents (Nah, Faja, & Cata, 2001). The spread of ERP is not only across the globe but also includes different types and scales of industry. Although the current generation of ERP systems evolved from technology designed for manufacturing industry (Klaus, Rosemann, & Gable, 2000), it has been implemented in many other types of industries, such as service industries (Botta-Genoulaz & Millet, 2006), government and non-profit organizations (Kumar, Maheshwari, & Kumar, 2002), and even higher education (Allen & Kern, 2001; Mahrer, 1999; Volkoff, 1999, Wagner & Newell, 2003). Similarly, although initially the intended market for ERP was large-

[1] The use of quotation in this study: Double quotation signifies either the open ended contested nature of the term within the quotes or that the source of the text within quotes is oral communication. Single quotation indicates that the source of the text within quotes is archival materials such as articles, documents, and emails.

scale industries, later it moved to the Small and Medium Enterprise (SME) sectors (Everdingen, Hillegersberg, & Waarts, 2000; Knol & Stroeken, 2001).

ERP implementation is an important topic of investigation on other grounds as well: the investment of money, effort, time, and its impact on organizations. In 2007, the investment in ERP implementation was about 700 billion USD in the U.S. alone and about 2000 billion USD in the other parts of the world (IBM research report, 2007). If we examine the annual revenue of the top five players in this market, it is approximately a 30 billion USD market (Datamation, November, 2005; see figure 1.1 below).

	2005	2006	2007	2008	2009	2010	CAGR
License	$7,010	$7,360	$7,802	$8,348	$9,016	$9,737	6.8%
Maintenance	$9,602	$10,371	$11,200	$12,208	$13,307	$14,505	8.6%
Services	$7,212	$7,284	$7,430	$7,653	$7,882	$8,119	2.4%
Total revenues (millions)	**$23,824**	**$25,015**	**$26,432**	**$28,209**	**$30,205**	**$32,361**	**6.3%**

FIGURE 1.1 ANNUAL REVENUE OF FIVE TOP ERP MARKET LEADERS
(source: Datamation, November 2005)

Organizations have invested in ERP implementation not only in terms of money but also time and effort. From initiation (defined by vendor selection) to completion (marked by extensive use of the system), ERP projects duration ranges from one year to five years (Bingi, Sharma & Godla, 2001) in a single firm, demanding efforts from various organizational members. Once implemented, it can directly affect a range of

stakeholders varying from a group of employees in an organization to customers, suppliers, and regulatory agencies (Chang, 2004; Davenport, 2000). Practitioners claim that ERP has had huge impacts on organizations worldwide, and in turn, on our society (Davenport, 2000; Gunasekaran, 2008). ERP has also been projected as an unavoidable necessity for modern organizations (Wagner, 2004; e.g. Davenport, 2000; Rutner, Gibson, & Williams, 2003). In sum, it is empirically important to understand how organizations create a working ERP system.

Within the present context of globalization, technology implementation occurs trans-nationally and cross-culturally. For example, in the last few years ERP implementations have mostly been occurring in non-Western countries such as India, especially in subsidiaries of Western multinational corporations (Gunasekaran, 2008; Huang & Palvia, 2001). With its Western origin, design, and content of Western business practices (called "best" standard business practices), getting ERP to work in non-Western contexts has different and unique challenges (Davison, 2002; Martinsons, 2004; Soh et al., 2000) than what has been the case with other Western originated and designed technologies (Walsham, 2002, Walsham & Sahay, 2006). An example is the less-understood influence of local organizational and societal culture on technology implementation (Agourram, 2009; Borchers, 2003; Sahay, 1998), specifically ERP implementation (Soh et al., 2002). Cross-cultural and trans-national factors, such as differences in tax systems across countries, is particularly important in the case of ERP (Sheu, Chae, Yange, 2004; Sheu, Yen, Krumwiede, 2003; Soh et al., 2002) since, as I mentioned above, ERP contains Western business practices that are claimed to be standardized globally valid best practices (Grant, Hall, Wailes, & Wright, 2006; Wagner et al., 2006).

The context of this dissertation is a trans-national cross-cultural implementation: ERP implementations in two organizations in India--an increasingly attractive business location for Western multinationals. One organization is a manufacturing subsidiary of a reputed Western multinational organization, which I call WestIndia in this dissertation for the sake of anonymity, and the other is a local government owned public manufacturing firm, which I call GovIndia (pseudonym) in this dissertation. While WestIndia is a part of a large business corporation, GovIndia falls in SME sector.

While earlier ERP adoption was confined to large corporations, recently it is burgeoning in the SME sector (Chen, Sun, Helms, & Jih, 2008), especially in developing countries such as India (Singla, 2005). Many of such implementations occur in public firms (Singla, 2005). Perhaps due to its recent origin, ERP implementation in the SME sector is relatively less understood (Chen et al., 2008). Given a) the contemporary trend in ERP implementation (implementation in developing countries and the SME sector), b) that this trend occurs in other technology implementations, and c) ERP offers unique challenges, such as cross-cultural difficulties in managing the implementation, it is important to understand how organizations construct a working information system in such cross-cultural context.

Within the issue of constructing a working IS, my dissertation focuses on the cross-cultural negotiations about the changes--both technological (e.g. modification of the software code) and organizational (e.g. changes in the organization's existing business practices) that occur concurrently. Here, cross-cultural negotiations mean the negotiations between the cultural aspects embedded in the ERP practices and the cultural aspects that underlie the adopting organization's local business practices. Such

negotiations precede and follow a collective sensemaking (Weick, 1995). Therefore, to understand the change process holistically and contextually, we need to examine the sensemaking about technology and its implementation. Also, implicit in the question of how organizations construct a working IS is the assumption that the consensus on the operations and operability of an IS is socially constructed[2]. To understand this social construction, scholars have suggested focusing on the sensemaking of the actors involved (Weick, 1995). Within negotiations and sensemaking, this study focuses on the process of how the political strategies (with the underlying exercise of power) that actors adopt influence ERP implementation, in particular, the modifications of ERP software, through the actors' sensemaking about ERP technology and implementation. More specifically, the central question of this dissertation is: [3]*In a cross-cultural context, how do organizations construct a working ERP software through the exercise of power during ERP implementation in organizations?* The particular focus on the role of exercise of power or political strategies is partly due to a) my personal interest in power and politics within organizations, b) my understanding from experience with IT implementation that political processes have a complex, significant, but less attended role in technology implementation, c) the preliminary analysis of my field data which showed that majority of change issues in the two organizations clustered around important political processes occurring in the organization and the wider environment, and d) lack of studies that focus on role that the exercise of power and political strategies play in constructing a working technology in organizations.

As I mentioned above, one of the expected contributions of this study is an in-depth understanding about the role of politics that is exercise of power and its effect in

[2] Social construction means the interrelated web of the social process through which orderly, predictable relations are produced and reproduced (Berger & Luckmann, 1966).
3 Unless otherwise specified, all italics are mine. The intention is to highlight the point.

sensemaking and negotiating simultaneous changes in technology and organization in a cross-cultural context. As my literature review in the next chapter shows, this is a relatively less researched topic in the organizational and technology change literature. There is an emerging interest in organization studies and management studies in understanding the link between sensemaking, politics, and negotiations in the context of technology-organizational change (Badham, 2005; Grifith, 1999; Weick et al., 2005). Yet, in the case of implementation of new ITs such as ERP, organizational studies are scarce while the practitioner literature is abundant (Volkoff, Elm, & Strong, 2007; Wagner, 2004).

To investigate the politics of change negotiations, my study takes a critical theory perspective (Alvesson & Deetz, 2000). I question the taken-for-granted assumption that the standard practices built into the off-the-shelf ERP software are "best" and globally "valid". Further, I unmask the instrumental nature of the off-the-shelf ERP software and the attempts of the managerial elite to preserve and extend their power over labor, and the consequent resistance of the employees. I also reveal how a new worker identity is produced along with the ERP implementation. Thus, I argue that implementation of IT can involve co-production of a new worker identity contributing to a central topic of critical management studies, production of worker identity (Alvesson & Willmott, 2002). Further, I develop a process model that explains how actors manufacture a seemingly widely shared consensus on the meaning and use of technology and the to-be-done modifications of technology. The model provides a theoretical framework to understand the politics of sensemaking during IT implementation in organizations from a critical perspective. Since such a process model is rare in the critical literature on technology implementation, I expect that the model will advance the research in 'critical management studies' (Grey & Willmott,

2005). Further, the critical organizational studies on technology mediated organizational change have a predominant focus on the politics involved in creating a consensus on the should-be-use and the should-be-meaning of technology or in other words the 'politics of technical inscription' (Spicer, 2005), which is prospective in its nature. My study augments this stream of research by examining the influence of the exercise of power on the retrospective sensemaking (Weick, 1979; 1984), for example framing of the evolving meaning (not potential meaning) of ERP and its felt-use (not potential use). My study shows that it is important to understand this process of framing, which is under researched in organizational studies (Van de ven, 2005), since, as I show, it is framing that shapes the subsequent politics of technical inscription. Also, the above-mentioned stream of studies focuses generally on one modality of power that is discursive persuasion. My study highlights the role of coercion in manufacturing a seemingly shared sensemaking in terms of a consensus on frames. It develops a new notion that I call institutional closure and questions an assumption in the organizational sensemaking literature that there is a cognitively shared sensemaking across actors.

Studies of Enterprise Systems, especially ERP, have been central to IS research. In the ERP literature, as scholars point out (see Wagner et al., 2006), there has been a disproportionate focus on implementation outcomes, especially factors critical to success and failure, compared with implementation process. Such studies imply that creating a working IS is a linear process and that technology often controls the success or failure of a project (Wagner, 2004; recent examples: Business Process Management Journal, 2009; Cruz-Cunha, 2009; Zhu, Li, Wang, & Chen, 2009). Recently, critical IS scholars started 'fleshing out' the negotiations instead of prescribing the critical factors for successful IT implementation (e.g. Wagner et al., 2006; Pollock &

Williams, 2009). I join these critical IS scholars. The contextual focus of these scholars is mostly Western large-scale corporations. Therefore, my focus on non-Western SME (including a public organization) and cross-cultural negotiations complement these critical IS studies. In IS studies, recently, there is an emerging focus on ERP implementation in non-Western SME context (for a review, see Cruz-Cunha, 2009). But this stream of studies does not examine the sociopolitical construction of ERP. Therefore, my focus on the sociopolitical construction of ERP in non-Western SME and cross-cultural negotiations contribute to this stream of studies. Moreover, my study generates different insights into the managing of ERP implementations showing how cross-cultural conflicts are resolved primarily through exercise of discursive power that results in a cross-cultural IS.

This study contributes to the IS literature in one more way. To map the collective sensemaking of actors, I use the concept of technological frame that I borrow from IS studies and Social Construction Of Technology (SCOT) studies. I show how technological frames are changed and stabilized over time as they interact with the exercise of power in organizations. This linkage framing of technological frames and politics is an under-researched topic in IS (Davidson, 2006). Thus, while most IS studies tend to assume that technological frames are static (Davidson, 2002; 2006), my study explores its dynamic nature. Further, while IS studies define technological frame by its use as a cognitive device for sensemaking, my study illustrates how technological frame is used as political device for sensemaking, more specifically as an emergent discursive resource for sensegiving.

The use of the dynamic notion of technological frames and the focus on socially constructed shared consensus on meaning of technology are central to the social

construction of technology (SCOT) literature. The SCOT framework and its elements, such as technological frame, have been widely used to understand technology development and use at a global level (see Oudshoorn & Pinch, 2007) but not to understand technology implementation *within* an organization. The SCOT literature shows how technological frames are formed, stabilized, and closed (called "closure") at a global level. I highlight how an element of the technological frame central to the SCOT studies—the meaning of technology—although treated as stabilized and closed in the global discourse about ERP, is again locally negotiated resulting in paradoxes. Also, while the SCOT literature focuses on two types of closures—rhetorical and redefinitional—my study shows one more type of closure—institutional. That is, technological frames are stabilized and closed through institutional means, such as coercion (e.g. termination of the proponents of opposing technological frames). I also develop another novel concept, technology non-affordance, that explains how perceptions of technical constraints, such as technical complexity that are usually taken as perceptions of objective physical (or material) properties of technology, are political constructions. Thus, I contribute to the recent debate on materiality (Pinch, forthcoming) in the sociology of technology literature.

In this chapter I introduced the research context, research question, empirical and theoretical importance of this study, and expected contributions. The remainder of the dissertation is organized as follows: chapter two presents a comprehensive review of the technology change literature in organizational studies and information system studies, particularly the ERP literature as well as the relevant work within a cross-cultural context and a public organization context. From the literature review, my research question emerges. Subsequently, chapter three discusses the research methodology and the empirical design that I chose to answer my research question.

This is followed in chapter four by a description of the organizations, their external environment and internal work environment, and the explication of the terms--cross-cultural context and the core concept of this study, “negotiating technology frame”.

The fifth chapter presents the illustrative analytical use of the core concept to analyze the ERP implementation in the government organization—GovIndia, and generates insights from the analysis. The sixth chapter repeats the illustration in a radically different implementation context. It also expands and reinforces the insights and concepts developed in the fifth chapter. In the final chapter I build a process oriented theoretical model based on the analysis of implementation across organizations. The model helps answer my research question. Subsequently, I conclude with the contributions of my study, the limitations of this study, and the suggestions for future research.

CHAPTER 2

LITERATURE REVIEW:
THE EMERGING SOCIOPOLITICS OF TECHNOLOGY IMPLEMENTATION

This chapter positions my research question in the current literature and points out the gaps in our knowledge base related to technology change in organizations, more specifically ERP implementation and the process of negotiating change over time. The chapter is a review of the work of leading writers whose research is helpful for positioning the analysis and contributions of my study. The literature review was compiled through a systematic review of key organizational studies journals, IS journals, and a few IS conferences and organizational study conferences from 1997-2009. I also refer to the prominent works in sociology of technology that are relevant to my study. To this end, I situate my research alongside other qualitative studies of technology change in organizations, and specifically ERP implementation within organizational contexts, that take a process view of change over time.

In the following section, I describe ERP technology. Subsequently, I present the literature review and the research question. Finally, I suggest an appropriate methodology to answer my question that will prepare the reader for the next chapter on methodology.

2.1 Enterprise Resource Planning (ERP): An overview

2.1.1 Definition of ERP

ERP is a packaged software that can be bought 'off-the-shelf' and tailored by an organization to integrate and share the organization's information and related business process within and across different functional areas (Davenport, 2000). Here,

packaged means that different modules while sometimes correspond to different functions in an organization, such as marketing, production, and accounting, are integrated and packaged together to make a single software. Modules are combined to create ERP suites for specific industry sectors (e.g. manufacturing, banking, retail) or company size (Klaus, Rosemann, & Gable, 2000). Organized in functional modules that draw on common databases, ERP packages establish inter-modular connections that recapture the cross-functional interdependencies of organizational operations. At the same time, the modular architecture of the package allows for functional autonomy and flexibility that address the specific requirements of each function (Kallinikos, 2004).

It is through the modifications of the functional modules that local solutions are derived. Unlike custom-built software that must be programmed in traditional ways to meet local needs, ERP software is generic, targeting multiple industries, and must be modified before it can be used, though the degree of modification can vary depending on many factors. Once modified and implemented, the technology often replaces homegrown, discrete information systems and applications with a single infrastructure. The precursor of ERP, Business Process Reengineering, usually is an integral part of most ERP implementations (Sarker & Lee, 2000). ERP software, when combined with efforts to re-engineer work or business practices, promises to streamline organizational activities by eliminating duplication of effort and data (Davenport, 1998). This is expected to facilitate increased confidence in organizational data and lead to timely and informed decision making by squashing 'silos or stove pipes of technology'--large, diverse, unintegrated and ageing systems (Bannister, 2001) and build an integrated platform upon which all business and administrative activities take place (Davenport, 2000; Norris, Hurley, Hartley, Dunleavy, & Balls, 2000).

Thus, ERP claims to seamlessly integrate into a single software based system various functions in a company like production planning, manufacturing, distribution, shipping, and finance and accounting. The off-the-shelf software contains standard business and work practices that are claimed to be "globally valid" and "best" (Wagner et al., 2006). By business and work practices I mean the processes that are executed repeatedly in various departments of an organization. Examples are raising a purchase order, scheduling production, and raising sales invoice. The software offers to replace an organization's local business and work practices with this standard best practices. Through such replacement, ERP standardizes local work and business practices. For the purpose of integration and standardization, ERP technology, as perhaps any technology, reconstitutes organizational operations only after it has broken them down into the minutest detail. The meticulous definition of data items, the precise identification of transactional steps, and the fashioning of such steps into clearly described sequences that cover the operations of the entire organization are essential to ERP packages (Kallinikos, 2004).

Regarding the coverage of ERP software, an ERP system usually spans multiple departments in a corporation, and in some cases, especially with the new version of ERP, called ERPII, it will also transcend the corporate boundary to incorporate systems of partners and suppliers to bring in additional functions like supply chain management. Figure2.1 (next page) gives a simplified overview of generic ERP software along with the most frequently visible social actors. Next, I present brief account of the historical evolution of ERP technology.

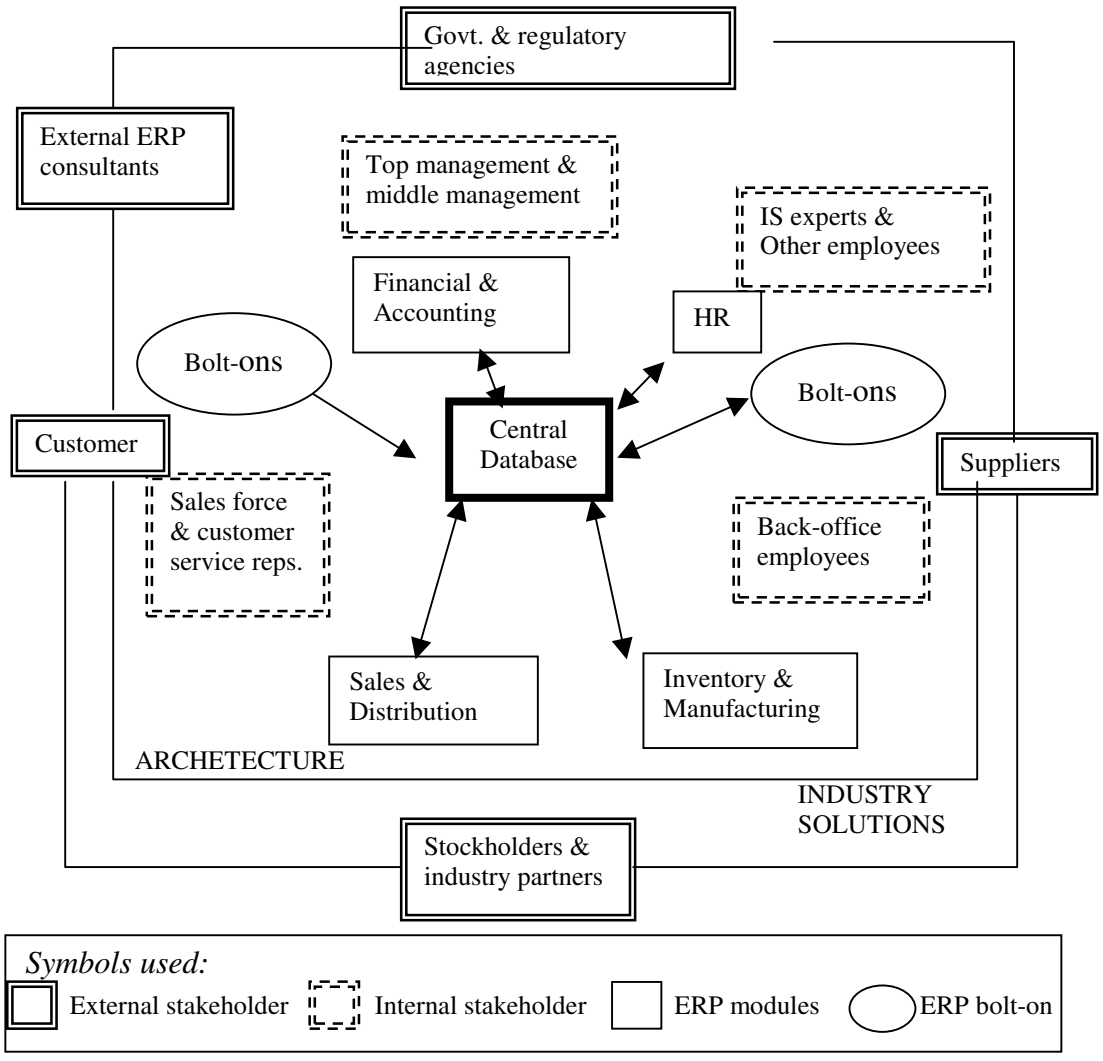

FIGURE 2.1 INTERNAL VIEW OF ERP SOFTWARE
(adapted from Davenport, 1998)

2.1.2 Evolution of ERP phenomenon

ERP systems evolved from technology designed to aid operations in the manufacturing industry (Klaus et al., 2000). The first genre software, called Materials Requirement Planning (MRP), was designed to help with inventory control. The second genre software, called Material Resource Planning (MRPII), was designed to help manage materials and manufacturing processes. Later, in 1990s, software vendors

exploited the notion of designing standard software packages that could be sold to multiple markets and across organizations within particular industries thereby increasing their economies of scale (Kremers & Dissel, 2000; Kumar & van Hillegersberg, 2000). This strategic move was based on the assumption that all contemporary organizations have generic business needs and could benefit from vendor and consultant expertise by implementing a standard business solution as their information infrastructure. Therefore, MRPII functionality was expanded by including most enterprise processes such as operations and logistics, financial and managerial accounting, human resources, and sales and order management (Davenport, 1998; Kumar & van Hillegersberg, 2000). This evolutionary process took unpredictable directions as local vendors redesigned standard ERP packages to their own advantage in order to penetrate untapped markets (Bennett & Timbrell, 2000; Everdingen, Hillegersberg, & Waarts, 2000; Sprott, 2000).

This evolution has resulted in ERP becoming ubiquitous, spreading across different industries (Allen & Kern, 2001; Mahrer, 1999; Pollock, 2000; Volkoff, 1999; Wagner et al., 2006), covering small and medium scale industries (Liang & Xiu, 2004; Huang & Palvia, 2001) as well as large scale industries (the early adopters of ERP), and across the globe (Tham, 2002). Having presented a brief account of the evolution of ERP, I focus next on the changes that occur in standard ERP as it is implemented in organizations. My objective is to make the reader familiar with the modifications of the software and the possibilities for negotiations about the modifications.

2.1.3 Changing the standard ERP software: Configuring ERP

Unlike many other IT products (e.g. Microsoft project, Primevera, and other decision support system packaged software), ERP is basically a 'configurable technology'

(Pozzebon & Pinsonneault, 2005). Configurable technology means technologies that are highly parameterizable and are built from a range of components to meet the specific requirements of a user. Thus, although ERP is sold as an off-the-shelf product with built-in "best" business and work practices, in practice it is tailored to the needs of the user organization. Some times the consultants who bring ERP into the organization succeed in implementing the ERP software without significant deviations from the standard off-the-shelf model. Still, ERP software is changed to certain extent during its implementation. The process of making changes in ERP software is called configuring. A growing body of literature documents the changes during configuration of ERP and the difficulties that many organizations encounter when implementing ERP (Davenport, 2000, 1998; Kremers & Dissel, 2000; Markus, Petrie, & Axline, 2000; Scott & Vessey, 2000; Soh et al, 2000). In contrast to the development of in-house IS designed specifically to fit the needs of the organization, configuring packaged software there is often a tension between organizational working patterns and the technological constraints of the system (Hanseth & Braa, 1998; Kremers & Dissel, 2000; Walsham, 2001). In order to resolve the gap between the existing legacy of work practices with which the organization is familiar and standard ERP processes, the implementers have to consider a spectrum of choices ranging from changing the work practices of the organization to suit the ERP practices to configuring ERP to the required extent (Markus & Tanis, 2000; Soh et al., 2000). Below, I describe the extent of changes that ERP software could undergo during its configuration.

From practitioner journals, academic journals, and from my experience, I identify four different approaches to configuring ERP software:

2.1.3.1 Customization

Typically ERP software contains 800-1000 business processes claimed to represent "best" practices, and 8000 or more configuration tables. Users tailor the system to suit local needs by choosing between the business processes and setting table values (parameterization). In ERP terminology, this is called "customization." There are two types of customization: customization through module selection, and parameter selection. In a module selection mode the user can opt for certain modules (for different modules, see Figure 2.1). Once module selection is finished, the user goes for parameter selection. For example, within an inventory management module in the configuration table the user can choose between different inventory policies (e.g. Last In First Out vs. First In First Out), or product revenue by geographical unit, or by product line or by distribution channel. The number of configuration tables could vary from 1000 to 10,000 or more depending on the type of ERP software chosen (e.g. Peoplesoft vs. SAP R/3). Going through all of them is time consuming; Dell took a year on this task (Davenport, 1998). If the options in the configuration table are not good enough, the organization has either to use the existing Information System (IS), called legacy IS, and build an interface between the legacy IS and the ERP software, or change the ERP software code to incorporate the legacy IS and associated business and work practices. Both can dilute the integration and standardization ability of ERP (Davenport, 1998). Significant amount of changes could gradually transform ERP into a simple decision support software or an information sharing system similar to the legacy IS.

2.1.3.2. Extensions

Users also have access to "user exits," where local code can be provided in a specialized programming language (e.g. for SAP, it is called "ABAP/4") in which

local solutions can be implemented. They are called add-ons. These approaches, as well as the use of third-party "bolt-ons" (e.g. supply chain systems, customer relationship management systems), which are basically add-ons bought out from vendors other than ERP vendors, are called "extensions". There are also bolt-ons created during the implementation to meet the organization's requirements that are not bought out from vendors (the third party).

2.1.3.3. Modifications

Mabert, Soni and Venkataramanan (2001) criticize the success stories of off-the-shelf ERP implementation (with no change in ERP) pointing out that the system either needs extensive modifications or the company needs to go through a major re-engineering process (e.g. Business Process Re-engineering) to use it. Thus, either the organization or the technology or both are expected to undergo changes. The authors' meaning of modification is not clear; in ERP parlance modification means the possibility of changing the ERP code in a fundamental way (called changing the source code) to meet user needs. Modification is strenuously opposed by almost everyone knowledgeable in the field (Glass, 1998), presumably because it can increase the work load, cost, difficulty of maintaining future upgrades and time, and can dilute the acclaimed capability of the ERP such as its ability to integrate the disparate business functions and standardize them into the "best" practices. Even when customizations are needed to provide critical functionality, these are done without changing the source code through the development of add-on modules that are plugged into the ERP system's user exits (Soh et al., 2000). Still, there are reports about extensive modifications (Wagner, 2004; Soh et al., 2000). Extensive modification can even make ERP into a different technological product or artifact (Shanks, Seddon, & Willcocks, 2003).

The proponents of ERP system software who claim ERP as an embodiment of globally valid best practices argue that the system's complexity makes it impracticable to carry out major modifications (e.g. Davenport, 2000). Therefore, they argue, if there is a misfit between local business logic and ERP logic, the user organization has to yield to ERP logic for the system to be workable (Davenport, 1998; Kelly, Holland, & Light, 1999; Pireira, 1999;). This rhetoric[4] is accompanied by another rhetoric that claims ERP as a technological imperative for most organizations: "ERP is now considered to be the price of entry for running a business, and at least at present, for being connected to other enterprises in a network economy" (Kumar & Van Hillegersberg, 2000: 24; also see Davenport, 2000). Although current literature is dominated by reports of organizations that radically adjust work practices to fit the ERP needs (Brehm, Heinzl, & Markus, 2001; Davenport 1998; Willcocks & Sykes, 2000), a couple of case studies show that such technologically deterministic rhetoric does not reflect implementation reality (Brehm et al. 2001; Elbanna, 2007; Grant et al, 2006; Wagner et al., 2006). For example, Grant and his colleagues argue that 'technological determinism' was ERP's false promise, showing how organizations had to modify ERP after or during implementation as users mounted resistance based on their trial use of the system. On the other hand, departing from the above-mentioned social constructivist approach, scholars have argued that due to 'polyvalent constraints' (Kallinikos, 2004 a) that characterize the ERP and its implementation, modifying ERP significantly is illusionary (Kallinikos, 2004). Also, practitioners as well as academicians point out that regardless of how a company approaches it or modifies it, ERP is associated with significant changes in how a company does business. It tinkers with the workflows, alters long-standing work processes, can lead to downskilling or reskilling (Hall,

[4] Rhetoric refers to the form of discourse that primarily uses language to persuade others through instrumental or means-ends logic.

2005), and changes the work organization (Koch & Buhl, 2002) and the business organization (Davenport, 2000). Since ERP makes such radical changes to business processes, it is not unusual for job descriptions to change or be eliminated altogether. Companies often meet with employee resistance (Hall, 2006).

In short, ERP implementation is complex due to cross-module integration, data standardization, adoption of the underlying business model, compressed implementation schedules, huge financial investments, and, the involvement of a large number of stakeholders with varying, and many times, conflicting interests. The technology change process in ERP implementation gets problematic because the organization usually has to choose among adapting to the new functionality, living with the shortfall, instituting workarounds, or customizing the package.

In this section, I have described what ERP is claimed to be—its definition, its historical evolution, and how it evolves in organizations through qualitatively and quantitatively different types of changes. I also indicated the debate in the literature around changes of ERP software during its implementation: some scholars claim ERP as a deterministic transformative tool that embodies "best practice," while others challenge such claims. In the next section, I present a brief review of the historical development in the scholarly work on technology implementation, in particular IT implementation, and ERP implementation in organizations. Since ERP studies are primarily done in the IS field while the scholarly work in the IS field closely follows the development in the organizational studies field (Orlikowski & Barley, 2001), I review present the developments in both organizational studies and IS literatures. The review will highlight various conceptualizations of ERP that different theoretical traditions hold including the deterministic approach that I mentioned above. This is followed by a summary of the analytical discussion of the extant literature, which will

highlight the inadequacy of the present treatment to capture the political dynamics involved in IT implementation, in particular ERP implementation, and in technology change and technology mediated organizational changes. This situates my research question.

2.2 The conceptualizations of technology in general and ERP in particular

2.2.1 ERP as a deterministic imperative tool: The predominant view in ERP studies

The Information Systems (IS) literature on ERP technologies is saturated with studies from the system engineering and project management perspectives that look for some fixed "critical success factors" (Wagner et al., 2006; for a review, see Esteves & Bohórquez, 2008; Esteves & Pastor, 2001; Moon, 2007). Some of these studies try to predict the effect of ERP on employees, organizational factors, and firm performance (e.g. Sarker & Lee, 2000). Others prioritize critical success factors in order to advise managers about which ones are most critical for their organization (e.g. Somers, Nelson, & Ragowsky, 2001). This body of literature seems to suggest that developing and implementing an integrated technological platform like ERP is a linear process and that technology often controls the success or failure of the implementation (Bancroft, 1996; Bancroft, Seip, & Sprengel, 1998; Parr, Shanks & Darke, 1999). Such studies that promote a simplistic approach lack a nuanced understanding about the sociopolitical dynamics of the implementation that leads to success or failure. Some scholars have criticized these prescriptive approaches for their attempts to predict success (Ciborra, Braa, & Cordella, 2000; Farbey, Land, & Target, 1995) and their neglect of organizational contexts and processes (Bussen & Myers, 1997; Walsham, 1993). More importantly, the exclusive focus on the future of ERP trends

and the control of project outcomes has created a gap in the literature. Our understanding of the *work* involved in such projects – the socio-political negotiations that come to constitute the critical factors, the ways in which ERP implementations is constructed as a success or failure, or in other words, how organizations attempts to create a working ERP irrespective of the outcome of such attempt – remains limited in comparison.

In these outcome-oriented studies, ERP systems are assumed to be inscribed with state-of-the-art best practices for a particular industry, saving organizations from reinventing the wheel and from perpetuating local business practice anomalies (Cortada, 1998; Davenport, 2000). Irrespective of the context in which ERP is implemented, it is designed to yield the "best" results. In short, ERP is described both as an IT solution that integrates silos of legacy IS and a business solution that provides globally valid best business practices (Mabert et al., 2001). As I mentioned earlier, this description is supplemented by rhetoric about the unchangeability and exogenous nature of technology wherein, organizations have to yield to the ERP logic during the implementation to reap its full benefits (Davenport, 1998; Pireira, 1999), and about ERP as a technological imperative for most organizations to run the business successfully (Kumar & Van Hillegersberg, 2000) without which the organizations may not be able to survive in the increasingly competitive environment (Pireira, 1999). The business success and hence the survival is achieved through the transformation of the organization (Davenport, 2000). Thus, ERP is positioned to make a big "impact" on organizations.

The ERP proponents highlight the positive impact of ERP, such as employee empowerment through decentralization (Davenport, 2000), cross-functional

coordination (Taylor, 1998), and increased organizational efficiency (Davenport, 2000). ERP optimists tend to see ERPs as leading to a demand for higher-level skills among workers, paralleling claims regarding the upskilling effects of IT change in general (Adler, 1992). On the other hand, the critiques highlight the negative impact of ERP on organizations, such as larger workloads, loss of jobs, and increase in work stress (e.g. Hall, 2006). Scholars have also criticized ERP for its limited conception of human agency as a procedure enactment, neglecting other possible forms of human agencies like improvisation, and exploration (Kallinikos, 2004). With evidence drawn from five Australian case studies Hall (2005) argues that ERP implementation led to enhancement of managerial control at the expense of some worker autonomy, skills and workload. Compared to the large number of the positive impact studies of ERP, the negative impact studies are limited in number. Interestingly, the contradictory results (for example, reduction in worker autonomy vs. increase in worker empowerment) might be a reflection of the general contradictory results in IT implementation studies within organizations (Robey & Boudreau, 1999)—empowered employees (Attewell & Rule, 1984) and oppressed employees (Nelson, 1990); extended hierarchy (Blau, Falbe, McKinley, & Tracy, 1976) and reduced hierarchy (Crowston, Malon, & Lin, 1987); organizational rigidity (Whisler, 1970) and organizational flexibility (Foster & Flynn, 1984); increases in staff and radical downsizing (Brynjolfsson, Malone, Gurbaxani, & Kambil, 1994; Pinsonneault & Kraemer, 1997). Besides all these, ERP is described usually not only as an inert neutral product having no contextual influence but also as brought in by the "external" "objective" system "experts" called consultants who have both business and IT expertise (Howcroft & Light, 2006).

In these studies we can notice three levels of 'technological determinism' (Bimber, 1994) in the conceptualization of ERP technology: a) independent –ERP is described ahistorically as an off-the shelf product with no contextual influence on its implementation, b) exogenous- ERP is not only an off-the-shelf inert technology brought in by external experts but it has its own built-in logic to which the organization has to yield, and c) causal- ERP transforms organizations either positively or negatively. Similar to the contradictory claims about the impact of ERP on the organization, the technologically deterministic approach to ERP is probably also a reflection of the technological determinism in the IS studies and in the early studies on the technology-organization relationship.

2.2.1 Technology as a deterministic imperative tool: The predominant view in organizational studies and IS studies

The three forms of determinism—technology as an independent, exogenous, or a causal variable (Bimber, 1994) appear in organizational studies on of technology implementation. For example, new technologies like IT is conceptualized to be neutral intervening conduits by which managerial strategies are implemented (Child, 1985). Further, the IT consultants are cast as "objective" "neutral" "external" (external to the organization) parties who help the organization with their unique combination of both technical and business-know how (Bloomfield & Danielle, 1995). Similarly, there is large literature from the systems theory perspective that focuses on the independent causal impact of IT on the organization (for a review, see Esteves & Bohórquez, 2008; Moon, 2007). At a more general level, in much of the early work technology is treated as an independent exogenous causal variable that determines a range of organizational

aspects, including workflow (Woodward, 1958), size (Hickson et al., 1969), the variability and analyzability of tasks (Perrow, 1967) degree of task independence (Thompson, 1970), and more generally the structure of the organization (Pugh & Hickson, 1976; for a review, see, Fry, 1982; Miller, Glick, Wang, & Huber, 1991). For these researchers, the characteristics and uses of a technology are treated as a given which shapes all other aspects of organizational life.

Some researchers, especially those who examined the politics of technology implementation, turned this pattern of causation around to argue that *technology use* is shaped by structural, organizational, and economic demands. Here, technology is seen as a tool for economic or political domination (Braverman, 1974; Cooley, 1980; Marcuse, 1964). For instance, radical critics claimed that the structural requirements of capital accumulation have led to the formation of 'deskilling' technologies (Braverman, 1974) wherein frontline workers' local skills and practices were replaced with technology embodied skills and practices (see Noble, 1984: for illustration of Braverman's deskilling thesis). However, such studies (as Noble's) helped the students of technology change to come out of the "hard"[5] technological determinism.

Later organizational studies on sociopolitics of technology change (e.g. Barley, 1986; Cooley, 1982; Noble, 1984; Zuboff, 1988,) modified the technological determinism of earlier studies, especially the assumption about the origin and the choice of technology – its degree of externality or autonomy, highlighting that the choice of technology (but not its content) and its effect can be socially shaped. For example, Cooley (1986) and Noble (1984) attributed the changes in technological choices that led to deskilling to

[5] In "soft" technological determinism the choice of the technology rather than its content is socially shaped while in "hard" technological determinism technology determines the social (Smith & Marx, 1994)

political strategies and interests of powerful institutional actors rather than the inevitable progress of the technology. Zuboff's (1988) concern is the "automating" and "informating" potential of IT but not the political dynamics in making the content of IT and its social shaping. However, she emphasized that different organizational contexts influence the degree to which either potential is taken up and developed. Complementing it, Barley (1986) shows how similar technology (CT scanning) can be embedded into different social systems in different ways that occasion different outcomes.

Although these studies move away from "hard" technological determinism, there is still a "soft" technological determinism implicit or explicit in these studies: these studies consider technology as an exogenous shock to the social system at the workplace. Perhaps this residual determinism is due to less of a focus on the content of the technology than its choice and form. In soft determinism, shaping of form and effect of technology are considered but not the influence on content of technology (Smith & Marx, 1994). For example, while addressing the contextual influence on the use of CT scanners, Barley does not analyze the role of social agency in either the design of the CT scanners or their customization and adaptation during their implementation. Similar soft determinism is evident in IT design studies and the studies on the impact of IT. These studies focus on how to design technological artifacts "correctly" (on time and within budget), how users can adopt and appropriate technology effectively, and how IS can be used to produce desired outcomes. On the deployment and use side, researchers pay attention to the factors affecting technology - influence of culture, strategy, and change management (Kling, 1991; Robey & Sahay, 1996; Walsham, 1993), perception of the quality of computer interfaces (Jarvenpaa, 1991), users' satisfaction with the information produced (Ives, Olson, &

Baroudi, 1983), user willingness to accept technology (Davis, 1989), diffusion pattern (Cooper & Zmud, 1990), and social cognitive processes in the user community (Boland & Tenkasi, 1995; Orlikowski & Gash, 1994).

Underlying these studies is the adaptation to the material effect of technology. Moreover, the IT design and use studies altogether neglect the influence of institutional factors like organizational politics on technology change. Some of the above-mentioned organizational studies (e.g. Barley, Noble, and Cooley) and some of the IT impact studies consider such institutional influences, but they do not address how institutional factors such as the exercise of power in organizations, influence modification of the content of technology.

However, following the earlier lead in organizational studies, such as the Noble study on production technologies, several critical reviews questioned the deterministic logic underlying the analyses of the organizational impacts of information technology (DeSanctis & Poole, 1994; Hirschheim 1985; Kling, 1980; Markus & Robey, 1988; Orlikowski & Robey, 1991; Walsham, 1993). Drawing from various sources, these authors argued for a more complex relationship between information technology and organizations, advancing concepts such as emergent and reciprocal causality, and promoting interpretive research methods. These suggestions have influenced recent empirical studies, and have produced more elaborate analyses of organizational change, especially organizational change mediated by the sociopolitical dynamics of IT implementation (e.g. Volkoff, Strong, & Elmes, 2007). The professional management literature also manifests greater sophistication of argument, rejecting the optimistic determinism of earlier writings on the transformational potential of information technology (Galliers & Baets, 1998; Glass, 1998; Markus & Benjamin,

1997; Sauer& Yetton, 1997). Next, I turn to this move away from hard and soft technological determinism that occurred first in sociological and organizational studies on technology implementation, especially the political dynamics of technology implementation. This move was followed by a similar shift in the conceptualization of IT in IS implementation studies in the field of IS literature.

2.2.2 Technology as a sociopolitical construction: The emerging view in organizational studies and IS studies

The constructionist movement of the 1980s and 1990s argued for conceptualizing technology as a social construction that implied the technical (e.g. ERP technology) and the social (e.g. users or organizations) as either tightly coupled (e.g. structuration approach), interactively co-evolving entities (e.g. sensemaking and co-evolution approach: see, Weick, 2000), a sui generic single entity called sociotechnical ensembles (Bijker, 1995), or a mutually inscribed network of human - non human actors with vested interests (Callon, 1991; Latour, 1996; 2005; Law & Hassard, 1998). McLoughlin and Badham (2005) briefly review the effect of this move on the political studies of technology implementation.

In the editors' introduction to the 2005 special issue of the Human Relations journal on political process perspectives in organization and technological change literature, McLoughlin and Badham identify three waves in this body of literature. The first wave, which is roughly from 1950s-1990s, covers the technologically deterministic approach, both hard and soft that I discussed earlier. In organization theory, Child's 'strategic choice' (1972) critique of the technological determinism embedded within the contingency studies that were dominant at the time probably marked the shift from

hard determinism to a soft determinism. The second wave roughly spans 1990s – 2000. The focus was on work organization and technology connection, especially new technologies like IT. Generally, we can identify two streams of studies. The first comprised the studies that focus on the relationship between new technology and workplace control (e.g. Barker, 1993; Sewell, 1999; Thompson, 2003; Warhurst & Thompson, 2000). There were numerous studies that focused on lean production, total quality management, and employee empowerment, (for a recent brief review, see Batt & Doellgast, 2005). The second stream comprised studies from perspectives such as institutional, structurational, and 'processual' approaches (Dawson, 1994). A few of these studies incorporated insights from the studies in sociology of technology. Still, the predominant approach of technological determinism (hard or soft) remains. According to McLoughlin and Badham (2005) a third wave that examines the sociopolitical construction of technology seems to be emerging. European organizational scholars have done most of these studies to which I turn next.

Following the lead of the social constructionist approach to technology implementation, these studies assume that the technical and the social not only merely influence each other but also get intertwined as the social (e.g. the socially constructed meanings of ERP) creeps into the technical. This is a vital lynchpin for these studies of the political process, because the 'meaning given by relevant social groups actually constitute the artifact' (Bijker, 1995: 77). This attribution of meaning to a technology as these studies show, involves actors mobilizing a system of sense-giving discourse in order to persuade other actors. This discourse shapes how the technology can be spoken about and understood (e.g., Grant & Hall, 2005; Spicer, 2005). This process, called "technical inscription" (Joerges & Czarniawska, 1998) involves creating a fixed meaning and a set of uses associated with the technology. Collectively these studies

argue that discourses inscribed into a given technology shape how potential users understand a technology and its possible uses (Munir & Jones, 2004). This has been empirically demonstrated in the studies of the use of information technology in health care (Bloomfield & Best, 1992; Bloomfield & Coombs, 1992; Doolin, 2003), the introduction of the Lotus notes system (Hayes & Walsham, 2000), a computerized trading system on the London insurance exchange (Heracleous & Barrett, 2001), the pesticide DDT (Maguire, 2004), and photo-imaging technology (Munir, 2005; Munir & Phillips, 2005). Each of these studies that assumes a Foucauldian perspective demonstrates how a discourse inscribes order and relations of power into a given technology. Thus, the general focus is on the persuasive political dynamics of technical inscription. *The exclusive focus on one of the processes that involves deciding what technology should be and what its uses should be (as opposed to what technology is and what its uses are: a retrospective sensemaking) and on one modality of exercise of power (that is persuasion) neglecting the possibility of other modalities, has generated a less nuanced picture of the political dynamics and a less holistic picture of the processes (with its inter relations) involved.* Although McLoughlin and Badham (2005) in their recent review do not explicitly mention this point, they conclude by suggesting that there is a dire need for political process study that investigates the political dynamics that interact with technology modification and the naturalization of technology as a part of the organization in a *holistic* manner. Also, note that all of the organizational studies on politics of technology or information technology implementation that I mentioned so far were done in a Western context. We can see these two points—exclusive focus on persuasion and the Western context--repeated in the emerging IS studies on sociopolitical construction of IT, especially ERP technology.

In the IS field, the early studies from the 1990s that took a social construction perspective did not focus much on the political dynamics (Van de ven, 2005; see Orlikowski & Baroudi, 1991). Typical examples of such early studies are the studies from the structurational approach such as the Orlikowski studies and the Walsham studies (Jones, Orlikowski, & Munir, 2004; Orlikowski, 1992; Orlikowski, 2000; Orlikowski & Robey; 1991; Walsham, 1993). Although very limited in numbers (compared to other social constructivist studies), a few of the later studies examined the sociopolitical construction of IS in organizations (for a review see: Jasperson, Butler, Carte, Croes, Saunders, & Zheng, 2002). Noting the countable number of studies that examine sociopolitics of IT implementation, Jasperson et al., (2002) called for more scholarship in this direction. *Similar to the organizational studies on the sociopolitical construction of ITs in organizations, the countable IS studies on sociopolitical construction also have an exclusive analytical focus on persuasion and are done in Western context* (see Jasperson et al., 2002). This observation is equally applicable to the ERP studies on sociopolitical dynamics that both organizational scholars and IS scholars carried out so far.

2.2.4 ERP as a sociopolitical construction

Drawing on the insights generated in social constructionist literature, institutional theory, and structuration approach, some scholars came to conceptualize ERP as either an institution or a structure in its own right. For example, Ciborra (1993) has applied Star's (Star, 1999; Star & Ruhleder, 2001) notion of information infrastructure to IT in general, and ERP in particular, and highlighted its similarities with institutions. Ciborra (1993:31) and the scholars who followed his lead (e.g., Avegerou 2002; Ciborra & Hanseth, 1998) argue that ITs like ERP can assume the properties of an

institution or a formative context as it takes shape in relation to other institutions of modern society. Thus, ITs like ERP is considered as an institution on the basis that it "constitute background condition for action, enforcing constraints, giving direction and meaning, and setting the range of opportunities for undertaking action" (Ciborra & Hanseth, 1998:315). The implication is that ITs are infused with values and achieve a status of taken-for-grantedness. Such studies on ERP highlight the importance of myth making as a vehicle by which technological attributes are rendered "real" and come to influence ERP implementation. At the core of such processes lies the radically different interpretation or meaning that different social groups attribute to ERP (Klaus & Gable, 2000), which is basically a process of social construction (Pinch & Bijker, 1984). Although the social constructionist approach is widely used in IS studies that focus on political dynamics, as we can see below, most of these studies take an Actor Network Theory (ANT) perspective. SCOT, the approach that I take in my study, is rarely used in IS studies.

ANT is widely applied in IS studies to investigate IT implementation (Mitev, 2006; e.g. Monteiro & Hanseth, 1995; Monteiro, 2000; Walsham, 1997), *specifically ERP implementation in organizations* (e.g. Boland & Schultze, 1996; Dechow & Mouritsen, 2005; Elbanna, 2007; Hanseth & Braa, 1998; McMaster, Vidgen, & Wastell, 1999; Quattrone & Hopper, 2001; Wagner et al., 2006) *while other social constructionist approaches such as SCOT are rarely used*. As applied in IT studies, epistemologically ANT does not differentiate between the human and the non-human like ERP technology, a technological artifact. Following the same line, in ERP literature, those who apply the ANT perspective consider ERP as an actor equivalent to social actors. For example, in one of the first studies of ERP implementation from an ANT perspective, Hanseth and Braa (1999, 1998) highlight the persuasive power of

software to influence human actors thereby directing the project initiative. Some scholars followed this lead and used ANT to investigate ERP's as well as the social actors' persuasive influence on other social actors (recent examples: Elbanna, 2007; Wagner et al., 2006).

Latour, one of the main proponents of ANT, notes that "technology is society made durable" (1991:103) which means that in their design, practices, like the best practice materialized in ERP, take a more tangible form and thereby stabilize social interests. Hence, it is probable that the vested interests groups might attempt to silence the opposing voices or coerce the conflicting interest groups while developing or modifying the technology artifact. Still, the possibility of coercion has gained either a passing attention or a descriptive role in the ERP studies that take ANT perspective. The scholars who use the ANT perspective to understand IT implementation (Walsham, 1993), specifically ERP implementation (e.g. Elbanna, 2007; Scott & Wagner, 2003; Wagner et al., 2006), highlight the multiplicity of interests, the persuasive negotiations among such interest, the coalition and consensus formation, and the inscription of such interests into ERP technology (Pollock & Williams, 2009). I join this stream of research to the extent that I highlight the multiplicity of interests, and examine the political dynamics of the coalition and subsequent consensus formation, and the inscription of interests into ERP software.

From a social construction perspective, these studies usually highlight the mutual influence of various socially relevant groups and the formation of social consensus through the compromise or accommodation of different meanings and practices. For example, take one of the mostly widely cited U.S. studies--the Wagner studies (Scott & Wagner 2003; Wagner & Newell, 2003; Wagner et al., 2006) of ERP tensions in an Ivy League University-- the tension or conflict between the 'local interest' supported

by faculty members and associated administrative employees and the ERP's best practice interest (or the 'global interest') promoted by some administrative employees, and their central leadership (represented by the Vice President of administration: VP), and vendor representatives. I consider this study in detail here since it is one of the very few studies that focus on the sociopolitics of negotiations about ERP modification, the central focus of my study. The main theme of these studies is the mutual influence of various actors like ERP, the ERP project team, the faculty members, and administrative users and the resultant "achievement of order" through the accommodating synthesis of local and global (ERP) practices. Using an ANT approach, Wagner and her colleagues map the tensions involved in the evolution of ERP implementation of a financial accounting module. Although consultants tried to sell the off-the-shelf model, the faculty members and the associated administrative staff did not accept it; rather they compelled the consultants to accommodate the traditional existing practice of Commitment Accounting (CA) into the ERP system or to replace the ERP's standard Time Phased Budget (TPB) with Commitment Accounting. Faculty members (or Principal Investigators) had vested interest in CA as it gave them more flexibility and faster reports (compared to TPB) with the most critical information they were looking for, how much money is left for them to spend. It was surprising for the faculty members that only a few of them were invited to participate in the discussion regarding this substitution. Subsequently, Ivy's academic network "enrolled" enough powerful actors to "conscript" the VP and his project team and created a "translation" point where administrative interests had little choice but to accommodate faculty interest. Finally, yielding to the mounting pressure from faculty members, the VP and his project team had to create a bolt-on to accommodate the faculty interest. Subsequently, it led to a number of modifications.

Unlike other ERP studies that highlight the exclusion of end user influence (e.g., Sawyer, 2001), this case study gets into the end-users' (faculty members and associated administrative staff) influence and its accommodation into ERP. But, the central thrust is on the resolution of the *articulated* conflicts between the local traditional work practices and the ERP's "global" work practices through *persuasive* means and the resultant evolution of a shared social consensus through *compromises*. For example, the major part of the story is the articulation of the conflicts and its resolution through making a "boundary object" (Star & Griesemer, 1994) of accounting practice that encompassed features of both local accounting systems and ERP' standard global accounting system. As the story evolves, even amid the multiplicity of epistemic cultures (the academic culture of the university and the corporate culture that ERP and its promoters embody) and of time perspectives (the local rhythms of work that the university follows and the global clock time that ERP propounds) the creation of boundary objects finally leads to the "achievement of order" and to the acceptance of ERP as an "organizational matter-of-fact". With a greater focus on the resolution of conflicts through persuasive processes and the resultant achievement of order, the Wagner studies do not focus analytically on other modalities of power such as coercion although they indicate the role of coercion in constructing a social consensus (e.g., the consultants forced to change ERP against their will). Rather, these studies illustrate the social constructivist idea of the rhetorical resolution of articulated conflicts, and subsequent "achievement of order" that could lead to a shared social consensus that accepts ERP as a working technology in the organization. In turn, such critical IS studies miss the opportunity to question the taken-for-granted sharedness of the social consensus that could be based on a manufactured consent of employees (Burawoy, 1984). Nevertheless, this study is a pioneering contribution to the burgeoning studies in sociopolitical dynamics of IT

implementation in organizations, and to the ERP studies, specifically from ANT perspective. Like the Wagner studies, many other scholars have also focused on either the possibilities of tension between the local practices and ERP's global practices or the negotiations about ERP technology in Western context (for a review, see Esteves & Bohórquez, 2008). Many of them call for further in-depth case research to better understand the tensions. Therefore, *the studies like the Wagner studies need to be followed up with a sociopolitical examination of ERP implementation that considers various modalities of power and in different organizational contexts and cultures.*

Another stream of sociopolitical negotiation studies focuses on the process of negotiations and its consequence. Howcroft & Light (2006) examined how vendors influenced the management's choice of CRM products in a UK organization, which resulted in accepting the system as successful despite user dissatisfaction. This is the only critical enterprise system study I could find that used a neo-Marxian approach to exercise of power that highlights the structural use of managerial power (the CEO imposing his decision on other employees despite their disagreement). *However, this study neither focuses on the implementation of ERP nor does it analyze the role of coercion in generating a seemingly shared consensus on the choice of ERP product.*

As I mentioned in chapter 1, implementation of ERP technology is an empirically and theoretically important phenomenon for organizational scholars to understand. Yet, surprisingly, there are only a countable number of organizational studies on ERP implementation. One of them (Volkoff, Strong, & Elmes, 2007) focuses on the technology mediated organizational change but not on the sociopolitical construction of ERP implementation. A few of them have an exclusive focus on the consequences of negotiations. For example, Elmes, Strong & Volkoff (2005) showed that ERP

negotiations in a U.S. organization resulted in enabling the users to perform more tasks (and thus making them more powerful) at the same time as it constrained them by making them more visible to their superiors and thus more monitorable. Hall's work (Hall, 2002; 2005) on Australian ERP implementation highlights the negative impact of ERP implementation on employees' working life. The only study I could find that focuses on the critical aspects of sociopolitical negotiations of ERP implementation is the Grant et al. (2006) study. They found that the management's discourse of ERP benefits in an Australian organization failed when end users started advancing counter discourses based on their actual experience with the ERP system. Subsequently, ERP was customized to some extent and the management appropriated the user discourse and protected the management's discursive legitimacy and power. Similar to the critical IS studies on sociopolitical negotiations of ERP implementation, the Grant et al. study too has exclusive focus on discursive persuasion and a Western context of study.

2.3 The need for a holistic process oriented approach and a non-Western study

The literature review presented above covered three streams of literature: a) the organizational studies on technology change in organizations including ERP implementation, b) the IS literature on implementation of IS, especially ERP in organizations, and c) the sociology of technology literature[6] as a theoretical foundation for studies on technology change in organizations. This interdisciplinary literature review highlighted four points. Historically, both organizational studies on technology change in organizations and the IS literature on IT implementation, especially ERP

[6] I do not claim of an exhaustive and systematic review of the literature in these three fields. As I mentioned in the beginning of this chapter, I reviewed only the prominent works that are relevant to my study.

implementation, have treated technology as an independent variable that brings forth organizational change. Following a social constructionist approach, there is a growing exception that investigates negotiations about modification of technology. Within this stream of research, the critical (in the sense of questioning the prevalent claims and taken-for-granted beliefs) investigation of the sociopolitical process involved in such negotiations is a nascent topic. In this nascent topic, most of the studies confine their focus to one modality of exercise of power, namely, persuasion, more specifically rhetoric or discursive persuasion, and on one of the processes such as inscription or consensus formation. Therefore instead of asking the implicit question of how do organizations construct (or still narrowly inscribe) a consensus on the working information system through a persuasive influence process, we need to ask a broader question of how do organizations construct a working IS through the exercise of power during the implementation of IS in organizations that do not assume a shared consensus per se. Such a question implies the need for a methodological approach that will not a-priori favor a particular theoretical perspective as far as the political process is concerned. Therefore, as I discuss in the next chapter, I chose grounded theory method as the methodology.

In the literature I also have noted some points for methodological consideration. Most of the IT/IS implementation studies, especially ERP studies, are done in a Western context. Also, scholars have noted that most of the in-depth studies of ERP implementations are done taking a single organization as the case (Pollock, 2009; Pollock & Williams, 2009). Moreover, the critical ERP studies, and more generally ERP studies, have neglected an important sector of economy—small and medium enterprise (SME) sector—although ERP is increasingly being implemented in SME sector. Thus, methodologically there is a need for a sociopolitical study of ERP

implementation in a non-Western SME sector taking multiple case studies. In chapter 1, I already have described and justified the need for understanding the sociopolitical construction of ERP in SME sector and in a cross-cultural context. Below, I further explicate the need for investigating the sociopolitical negotiations in ERP implementations in a non-Western context, which is expected to be a cross-cultural set up.

2.4 Negotiating cross-culturally: ERP implementation in a non-Western context

After tapping the Western market to some good extent, ERP traveled to non-Western countries (Huang & Palvia, 2001). India and China have been particularly interesting locations (Gunasekaran, 2008; Huang & Palvia, 2001; Liang & Xiu, 2005; Martinsons, 2004), but contrary to the vendor expectations, the ERP market did not pick up as high a momentum as it did in Western countries. One of the main reasons is attributed to the non-Western culture of doing business such as a preference to use non-computer media for transactions. Such peculiar problems during ERP implementation has made some writers label ERP a 'cultural misfit' for non-Western countries (Soh et al., 2000). They observed that the problem of cultural misfits resulted in more numbers of workarounds. For example, Soh et al. (2002) show how employees had to initially institute a number of workarounds since ERP practices were at odds with the practices of the local insurance systems. In this cross-cultural context, scholars have even called for developing a cultural perspective on ERP implementation (Boersma & Kingma, 2005). Such calls and the need to examine the sociopolitical construction of ERP, a Western originated and designed technology, is based on the consistent argument and illustration that technological artifacts (such as ERP) come to embody the culture and social knowledge of the space (or locale) and

the time in which it is created (Dubinskas, 1988; Van de ven, 2005). Yet, most of the studies that focus on ERP implementations in non-Western context do not examine the sociopolitical construction of ERP (for recent example, see Cruz-Cunha, 2009).

There are many studies that investigate the influence of local culture on IT implementations (for a review, see Walsham, 2003), especially ERP implementations. Most of them study the influence of local culture on the implementation outcomes. One of them (Sahay, 1998), although not on ERP implementation, is particularly relevant to this study since its context is India and it focuses on the difference in cultural assumptions that are inscribed in technology—Geographical Information System (GIS) technology—and the culture of the recipient Indian society (a set of public organizations in North India). Sahay (1998) show how the cultural difference led to an unexpected 'failure' of the project, failure defined in terms of the Western actors involved. At the same time the Indian actors defined it as a success since their definition of success was different. Although this study does not focus on the sociopolitical negotiations, it illuminates the complexity of negotiating through IT changes in non-Western organization. Since none of the non-Western studies in my survey of the literature focus on the sociopolitical negotiations about technology modification, especially ERP modifications, it is important to carry out such a study.

Given the epistemological and methodological concerns I raised above, it is important to choose a methodology that will allow an exploratory interpretive theory building approach to answer my research question. In the next chapter, I discuss my choice of methodology.

CHAPTER 3

RESEARCH METHODOLOGY

In the 2007, Academy of Management Review's special issue on interplay between theory and method, the editors called for researchers to make their ontological and epistemological stand explicit and to reflect on them. In the first section of this chapter, I present the epistemological position underpinning my study. I emphasize the interpretive epistemological approach and make explicit my ontological orientation. In the following two sections, I describe the research approach and tools employed in carrying it out, and describe the research design that uses grounded theory methodology. The methods used in the field study are commensurate with the interpretive epistemology and are specifically informed by the study's interpretive grounded theory approach (Glaser, 2004). The tools include unstructured and semi-structured interviews, direct observation, participation in meetings, group discussions, examination of archives including emails, and questionnaires. The remaining sections (four, five, and six) explain how I employed these methods in my study and how I meet the evaluation criteria that the methods stipulate. I conclude with a summary and a remark that prepare the reader for the next chapter—case study description.

3.1 The choice of research methodology: the interpretive epistemology

While scientific tradition argues that an objective reality exists independent of the observer and the aim of the researcher should be to bring those truths and laws that constitutes that reality, the ontology of the interpretive research assumes that scientific reality is socially constructed (Berger & Luckmann, 1966). This subjective reality can be accessed through the articulations of participants and researchers as a result of their sensemaking activities (Walsham, 1993; Weick, 1978). Thus, one gains access to

individual interpretations of reality that evolves into a collective construction of reality by collecting and analyzing such participants' articulations (Klein & Meyers, 1999). Therefore, the main aim of the researcher is to understand the process of sense making as situations emerge and are made meaningful by individuals and groups (Scott, 2000). While there are different philosophical approaches to understand and interpret this individual and collective sensemaking (Lee, 1991), such as the phenomenological, hermeneutical, and ethnographic, this study is informed by the ethnographic process of interpretation (Denzin & Lincoln, 2000; Geertz, 1983) because it could sensitizes me to the context enveloped in the reality construction.

The design of fieldwork should be consistent with the philosophical assumption underpinning the study. Epistemology becomes manifest within the chosen research methods and these in turn impact the status and nature of the data collected and the contributory claims made based on the research findings (Van de ven, 2007; Walsham, 1993).

3. 2 Research Method: Qualitative approach

The qualitative approach is one of the predominant and legitimate methods in organizational and management research (Edmondson & McManus, 2007; Van de ven, 2007). In an attempt to provide tools for studying social, cultural, and political contexts through the eyes of the inhabitants, qualitative methods work to elicit perspectives, observe activities, and reflect on interaction during field investigations (Geertz 1983; Denzin & Lincoln, 2000). Rather than employing research tools that work to quantify and test variables, qualitative methods help the researcher gain a close relationship between context, content, and process (Pettigrew, 1990). A qualitative approach is especially fruitful in nascent theory research—topics for which

little or no previous theory exists (Edmondson & McManus, 2007: 1161) or in developing midrange or intermediate theories that draw upon separate bodies of literature in order to propose new constructs and/or provisional theoretical relationship (Edmondson & McManus, 2007: 1165; Eisnehardt, 1989). As I stated in the literature review, there is scantly any theory available that explains the exercise of power involved in embedding organizational elements into information technology system during its implementation within organizations, especially in a cross-cultural context. Therefore, a qualitative approach is suitable for this study. Moreover, as Denzin and Lincoln (2000) point out, adopting a qualitative approach is a particularly effective strategy for capturing individual viewpoints by examining the constraints in everyday life and developing a rich description of the social world in action. Capturing rich descriptions is essential to studies that examine sensemaking (Weick, 1984)

There are various qualitative approaches that organizational scholars have been using, such as action research, narrative approach, and discourse analysis, with varying research agendas. Therefore, one needs to be careful about the choice of a particular qualitative approach—the research strategy.

3.3 The choice of research strategy: Grounded theory approach

The main research strategy selected for this study is grounded theory methodology (Glaser & Strauss, 1967). Similar to the qualitative case study approach, grounded theory uses an ethnographic in-depth case study approach. Yet, unlike the qualitative case study approach, where researchers tend to impose their pet theories onto the data, grounded theory claims to facilitate a more inductive approach (Glaser, 1998). Therefore, if the objective of the research is to build midrange theories, especially where there is lack of theories, a grounded theory approach can help researchers better

develop the theory from the data (Glaser & Strauss, 1967). Moreover, similar to the case study approach, grounded theory has gained legitimacy in organizational and management research (Suddaby, 2006; Van de ven, 2007) as well in IS research field (Orlikowiski & Baroudi, 1991).

While using grounded theory to describe and analyze empirical data, I also bring in some features of the qualitative case study approach. I situate my empirical data in their historical context by giving a rich description of the context. Such an approach has the benefit of not losing the 'thick description' (Geertz, 1983) of the context and simultaneously identifying the theory that emerges from the data through the systematic analysis that grounded theory provides. Moreover, I believe that such situating of the data will ward off the criticism against grounded theory-in-use for its decontextualization of empirical data (see Charmaz, 2006; Glaser, 2002, Goulding, 2002). This criticism of decontextualization could also point to the positivist ontology of grounded theory (Charmaz, 2006; Glaser, 2002). Therefore, there might be a loose coupling between my ontological position (social constructivist approach) and epistemological position (post-positivist epistemology coming from grounded theory). But, since my objective is to build mid-range theory and that grounded theory has been used in sensemaking IS studies (e.g. Boudreau & Robey, 2005; Orlikowski, 1993), I choose to use grounded theory methodology.

3.4 The selection of the case organizations and their locations

In a qualitative case study approach, the selection of the cases or the sampling of the case studies is sequential and conceptually driven (Miles & Huberman, 1994). But grounded theory emphasizes empirical concerns such as the probability of covering the empirical phenomenon under study to the maximum possible extent (Glaser &

Strauss, 1967). Therefore, the most important criterion for the selection of a case organization was that it should have an ongoing implementation of an ERP technology, preferably in its initial stage of implementation and likely to complete the implementation at least within a year—the approximate period of my fieldwork. Such organizations were available in different parts of the world. Since the focus of my study was partly on the process of embedding the contextual elements, such as the culture of the organization and the wider society, it was advantageous to have some knowledge about the social context in which the implementations would occur. Therefore, familiarity with the environment of the society was an important factor. Accordingly, I chose my home country—India--as the location to select the organizations. Moreover, in the age of globalization, the implementation of such technology projects takes place in an international cross-cultural context. Given most of the ERP products are designed and developed in Western countries, a non-Western country is particularly interesting. Coupled with this, there is a growing significance of Indian software industries in the international market, and India is a major destination for outsourcing software development and consultancy (NASSCOM data, 2004; Noronha & D'Cruz, 2009). On these grounds, India is a particularly interesting location to carry out this study. I prepared a pool of ten organizations that had ERP implementation at its initial stage and had plans to complete the implementation within the period of my observation. The pool contained seven manufacturing organizations and three service organizations.

Next, I considered access and data availability as the main criteria for choosing the organizations from this pool. Scholars have noted the importance of these criteria in selecting cases (King & Applegate, 1997; Yin, 2003). For example, King and Applegate (1997:29) note that access to case sites is fraught with difficulty because of

several “powerful barriers” to be overcome, including length of time, cost of research, access to managers, data availability, and the level of business sophistication. Four manufacturing organizations agreed to give me access in terms of sharing of company documents, employees’ time, other resources, and the permission to participate in some meetings. One was a public organization—a local government owned organization in my home state and the other three were private organizations: the first one a Western multinational organization in my home state, the second one a local private organization in my home state, and the third one a local private organization in another state in India. To enrich the theory by covering all nuances and variations of the empirical phenomenon the grounded theory suggests choosing contrasting cases (Glaser & Strauss, 1967; Goulding, 2002). The qualitative case study approach also suggests such contrast to increase the generalizability of findings (Yin, 2003). Therefore, I considered the degree of contrast as the next criterion. Although there were two similarities (geographical location in the same state and type of industry--manufacturing), the local government owned organization and the Western multinational private organization offered the maximum contrast along ten dimensions. These are described in Table 3.1 (next page).

TABLE 3.1: COMPARISON BETWEEN SITE 1--GOVINDIA AND SITE 2--WESTINDIA

Characteristics	Site 1 (The public: Gov India)	Site 2 (The private: WestIndia)
Ownership	State government owned, MD—a political appointee.	Market leading European private multinational that took over Europeanowned private multinational replacing the owner MD with a British MD.
ERP product chosen	Local ERP later turned into a new ERP product development; operational environment: Linux	Syteline—Infor (3rd in global market); operational environment: Microsoft windows
Product and production process	Basic chemicals; continuous production	Specialty transformers; batch production small-medium industry sector
Industry sector	Small-medium industry sector	Subsidiary unit of a large corporation
Geographical location	Chemical industry belt in a South Indian state	The only hardware company in a local "Silicon Valley" in the same South Indian state
Employee strength & average age of employees	200 (managerial staff) +2000 (non-managerial staff); average age: 45	40 (managerial staff) +260 (non-managerial staff); average age: 30
Labor relations	Reported in the media as peaceful during past decade	Reported in the media as conflictual during past decade
Market focus	Exclusively domestic market	Mostly international market (60% approx.)
Governance structure	Labor-management partnership with presence of trade unions (TUs) from the inception	No labor partnership; TUs not allowed as per Employer Protection Act (1995)
Age of the organization	48 years	12 years

Each of these ten dimensions has bearing on either the ERP implementation or the exercise of power or both. For example, the difference in the production process is important for ERP since ERP is a software that contains standard work processes. Among the three private manufacturing firms, given the accessibility of data, the proximity between the organizations, the location of the organization in the society

where I was born and brought up, and the degree of contrast, I chose the Western multinational organization in my home state. Moreover, my work experience in technology implementation with both a private multinational manufacturing firm and a public local manufacturing firm, and a family relationship with one of the managers in the public organization were added advantages. At the same time, the fact that I knew the manager might have introduced some bias (for example, some people might not have talked to me openly). However, I was conscious about such a chance and took all precautions (e.g. proposing and signing non-disclosure of information with the interviewees) to gain credibility and confidence of the interviewees. The interview data showed that the chance of such bias was negligible. Moreover, I was conscientious about maintaining utmost integrity with issues of privacy. My status as a relative of the manager meant that a few community member prodded me for confidential information by asking questions such as 'so what are the Materials saying about this?' or 'I heard you interviewed Mr.X in SQAD (plant 1), right? He is just an invertebrate-what did he say?' Maneuvering through the political landscape was difficult at times but my previous experience in conducting qualitative fieldwork helped me, once the community realized that I would not disclose information, they stopped asking. Next, I discuss further implications of selecting the sties.

3.5 Implications of selecting sites

I expect this interpretive field study to enhance our understanding of the contemporary small and medium scale manufacturing industry context in developing countries and the behavior of its members during a large-scale IT project. Where the characteristics of this study are present within other contexts, the researcher might expect the negotiations surrounding the localization of the ERP system to produce the same consequences (Barley, 1990; Baskerville & Lee, 1999). Further, the selection of

contrasting research sites theorized through the lens of organizational theory and sociology of technology should provide a conceptual vehicle that is useful for future research projects and informative for professional practice.

I am aware of the dominant perspective both within organizational literature and IS literature that intensive field study cannot be generalized to larger populations and is therefore of limited relevance. However, I join the scholars who have refuted this position and argue that such findings can be applicable to other contexts sharing the same empirical circumstances of this organization (see Barley, 1990; Baskerville & Lee, 1999; Eisenhardt, 1989; Yin, 2003)

An ontological belief that scientific reality is socially constructed underpins my interpretive epistemology. As such, the researcher is always involved in a circle of interpretation as he tries to make sense of the context. Inevitably the researcher will form prejudices, opinions and preferences based on his interactions and field site observations. My goal has been an awareness of, and accountability to, these biases. I documented my perspective in my research journal and actively sought to refine my perspective through interpersonal communication and the reading of official documents. Most importantly, I designed the study to support me in remembering my responsibility to be critical of initial interpretations. I explain this further in the next section on research methods.

3.6 Research methods

This section presents the methods I employed for conducting qualitative investigation of ERP implementation in two organizations. The main techniques for collecting data were semi-structured interviews, archival reviews, casual conversation among

employees, casual conversation with employees, and direct observation of various activities that included meetings, design and use of ERP software, and other organizational activities. Below, I explain the steps for collecting and analyzing data that I adopted.

3.6.1 Preparation of case study protocol

To conduct any kind of in-depth case study, scholars have suggested preparation of a case study protocol. The objective is to increase the rigor, reliability, and external validity of the study (Esienhardt 1989; Miles & Huberman 1994; Yin 2003). The case study protocol for this study included overview, field procedures, method of investigation and instruments of data collection, and planned interim analysis. I deliberately avoided preparation of outline of case study report—a usual part of case study protocol—since my intention was to build a grounded theory.

3.6.1.1 Overview of the case study

The overview contained primarily the objectives of the case study and the research question, the theoretical background on which my research question rests, and the role of protocol in guiding the investigator. Unlike a conventional case study approach, a theoretical framework or propositions were not formed at this stage since the intention of the study was to build theory through an exploratory study. Also, due to the sensitivity of the topic of this study—the influence of the exercise of power on technology and implementation from a critical perspective —the overview that I gave to the organizations I studied was very brief and couched more in general terms such as consensus making. For example, in both organizations, I presented the study as an attempt to understand how organizations manage to create a working information system from a standard technology package.

3.6.1.2 Field procedures

The field procedures included selection of the field sites and gaining access to the organizations that I already described, participation requests, and collecting resources needed in the field. Although the participation requests were made formally later, it was more informal in the beginning. For example, in the beginning I requested my contact person in the organization to introduce me to the ERP managers. Later on, as both organizations gave me a free hand to interview anyone, I made appointments first with the individuals involved in the implementation, and subsequently, with the individuals not involved in the implementation (for example, supervisors and non-managerial staff). All interviews in the field were in-person. Of the 154 interviews scheduled, I conducted 151 interviews.

Before the interviews, and even before entering the field, I had collected as much information as possible about the organizations from documents and websites. I also had collected information about the ERP software during my initial visits to the organization before gaining access. I also had my laptop, digital voice recorder (no laptop), pocket diary and pens (all the time), and other accessories with me in the field. The organizations had given me special permission (which they usually do not give to researchers) to keep and use my laptop and digital voice recorder in the organization during meetings (except a few meetings) and interviews. This shows the unprecedented access I got in these organizations. I was given permission of the interviewees before taping the interviews. The use of pocket size digital voice recorder avoided diversion of interviewees' attention from the discussion matter onto the device.

3.6.1.3 Method of investigation and instruments of data collection

As I mentioned earlier, the primary methods of investigation were interviewing (in-person) and direct observation. Additionally, I used questionnaire surveys based on the interim planned analysis. I collected data from multiple sources such as individuals (interviews), archives (company document and emails), visuals such as notice boards and placards, meetings, casual conversations among the employees (eavesdropping), and my casual conversations with the employees. I also had the opportunity to listen in on both formal and informal group conversations. I conducted group discussions as well. In Table 3.2 (next page), I provide a summary of these different methods of investigation, the multiple sources and the instruments that I used in both organizations. The use of multiple methods and sources ensured validity, reliability, and credibility of the data collected (Miles & Huberman 1994; Strauss & Corbin 1998). Note that I took multiple interviews of the same individual at various stages of the implementation to map the evolution of individuals' sensemaking.

Next, I describe how I used these instruments in the field to collect data starting with the interviews.

TABLE 3.2 METHODS AND SOURCES OF DATA COLLECTION

Location & time spent	**# of interviewees**	**# of times interviewed (# of person* # of times)**
Site 1 Private multinational August 07-March 08 8 months (2 weeks hiatus)	9 managers	4*3+2*2+3*1
	3 consultants	1*1+1*5+1*3
	14 engineers/officers	3*3+8*2+3*1
	9 supervisors/ clerical staff	5*2+4*1
	8 workers	2*2+6*1
	Total # of interviewees: 43	**Total # of interviewees: 60**
	Interviewed 90% of the people directly involved	Length of interviews: 30 min to 3.5 hrs
	# of meetings participated	10
	# of surveys	2
Site 2 Local government Sep 07-March 08 7 months (2 weeks hiatus)	8 Managers	1*4+1*3+6*1
	5 consultants	1*2+4*1
	24 engineers/officers	3*3+16*2+5*1
	11 supervisors/clerical staff	2*2+9*1
	5 workers	2*2+3*1
	4 TU reps (workers)	2*1+2*2
	Total # of interviews: 57	**Total # of interviews: 91**
	Interviewed 85% of the people directly involved	Length of interviews: 30 min to 4 hrs
	# of meetings participated	3
	Group discussion (with non-managerial staff)	5
	# of surveys	2
In both organizations:		
a) Functional areas covered: diverse b) organizational hierarchy covered: across, c) interview locations: inside and outside of organizations, multiple		
Other sources: Direct observations, archives, informal/casual conversations, employee conversations ***Note: * means a multiplication sign***		

As the qualitative case study approach suggests (Yin 2003), I prepared an interview probe. The interview probe consisted of an outline of some general questions. The objective of the probe was to provide a framework to articulate the bare necessity questions to be asked. But in line with the grounded theory approach, in most of the time during the interviews, I did not confine myself to these questions. Moreover, based on the preliminary analysis, I refined the interview probe after two months of field investigation. The revised probe consisted of seven general themes: a) meaning of ERP, b) expectations of ERP, c) anticipated and actual changes in ERP software and organization, d) reasons for implementing ERP, e) Implication of ERP implementation for one's own work and others' work, f) images of actors (consultant and users), and g) understanding about the process of implementation. The interview probe served as a reminder regarding the bare information that needed to be collected. All the interviews (except four due to reluctance of interviewees and another two which were conducted over telephone) and meetings (except two where permission was denied) were digitally recorded and transcribed verbatim. At the same time, I took detailed notes during the interviews. I transcribed all the interviews to my best ability with the help of my detailed notes. The verbatim transcription process was very time consuming with each 1-hour interview taking approximately 6-7 hours to convert into text. I did not use any voice recognition software; instead I listened to the audio records and transcribed it myself most of the time referring to the field notes in my research journal. The research journal, thus, helped fill-out the transcripts and supplemented the interviews. I added some notations to the end of transcripts from the research journal. These notations included pre and post interview banter, non-verbal cues, and my interpretation of events. An example:

> Although he had agreed for an interview at his office, now, he took me away to the canteen corner where there were none except two of us. He looked a bit timid in the beginning. Later on, he was comfortable. People consider him (name) to be close to the Purchase manager, who was fired three days back.

> (Name) is known in the company for his open talk and I found this to be the case in the interview. He seems to pay high respect to research activities and considers research as an exercise of finding the truth. Also, see, he mentioned in the interview, "I am telling this so bluntly since you look like a true researcher" (ref: Kool 0.1).

The research journal contained my observation, comments, informal or casual conversations (including eavesdropping), and practical information about office and plant locations and personal details that could help me develop rapport with interlocutors, such as hobbies, family members, or personal interests. Such rapport helped the interviewees to be at ease with me during the interview.

All interviews except the interviews with the external ERP consultants were in their native language (which is my native language). I translated the transcribed interviews into English. To test the goodness of translation, I picked up three transcripts randomly from the initial set of ten transcripts and gave it for rating to two independent expert translators. On a five point scale (below average, average, good, very good, excellent) both of them rated my translation as good. I had contacted them later for suggestions giving them a description of the context. I accepted their suggestions on translation (for example, customer "push-in" for customer "thirukikayattal" in native language was their suggestion).

In addition to the interviews, direct observations and participation in meetings served as primary data. I scanned various visuals such as the notice boards (for example, the notice on the company notice board and TU's notice boards), placards (for example, five out of seven displays in the plant in the multinational organization were about customer focus), postings, etc. While the Western multinational organization allowed me to sit through all ERP meetings and record it (but no recording of employee-

management council meeting), the local public organization did not allow me to attend most of their meetings. In the Western multinational organization, given my prior experience with ERP implementation and my engineering background, the MD told me that I could give suggestions in the meetings, if I wish. But I chose to be a silent observer. Both organizations offered me access to all ERP related documents including company correspondence with the consultants (such as emails and work contracts). In addition to these instruments of data collection, I also conducted group discussions with the non-managerial staff (called "workers").

Besides the methods I described above, I also conducted questionnaire surveys: two in each organization that I have not included in this dissertation. One survey in each organization was to measure the organizational members' perceptions about time in their work-life since perceptions about time in work-life came up as a main theme during the preliminary analyses of the data. Another survey in both organizations was an opinion survey to collect organizational members' opinions about certain aspects of ERP implementation, which emerged as central themes in the preliminary analyses of the data. One of these preliminary analyses was a planned interim analysis that I performed in November 2007, near the middle of my fieldwork period. I took a two weeks hiatus from the field to do this analysis.

3.6.1.4 Planned interim analysis

The final component of the case study protocol is the plan for an interim analysis (Miles & Huberman, 1994). The interim analysis helped me to question my biases and initial interpretations in the field, which were highlighted in the process of analyzing the data. It also helped me collect new data on the themes that emerged during the analysis (for example perceptions of time in work-life). At this point in time, I did not

have access to any content analysis software such as Atlas-ti or N-vivo. Therefore, I used manual coding and followed the procedures of grounded theory that I describe in detail in the data analysis section.

My research question is the following: in a cross-cultural context, how do organizations create a working information system through exercise of power? Preliminary analysis showed that one of the ways it happens is through influencing organizational members' sensemaking (Weick, 1995) about technology and implementation. Therefore, I started focusing more on how the exercise of power affects organizational members' sensemaking about ERP technology and implementation. For example, I started focusing more on the image about ERP technology, the actors (consultants and organizational members), and the implementation that the organizational members and the consultants held and projected over time.

In addition to this interim planned analysis, I performed cursory preliminary analyses approximately every two months. The timely transcription of major interviews and the detailed field notes facilitated this process of preliminary analyses. It also helped me prepare for the next stage of empirical work. Many times, the important issues and actors referred to in interviews and conversations set my agenda guiding me to the next round of interviews. This incremental and participant-led process meant that I was able to take opportunities to reach interviewees and collect their narratives that reflected their *in situ* sensemaking. The incremental and participant led data collection strategy allowed me to gain multiple perspectives by interviewing not only organizational allies but also controversial actors and non-involved organizational members who may have otherwise remained 'silent voices' (Star, 1991). In order to

get the free flow of the narration, I also added general questions such as 'please tell me what happened in the last implementation run (or meeting)'. Such general questions were supplemented with the 'bare necessity' questions that I outlined in the interview probe. The repetition of the 'bare necessity' question kept me in focus and increased the reliability. The results of the preliminary analyses were informally discussed with the 'key informants' (Yin, 1996) in order to refine my interpretation of events.

Similar to the evaluation criteria for the qualitative case study approach (Miles & Huberman, 1994; Yin, 2003), Strauss and Corbin (1998: 268) stipulate four criteria for evaluating a qualitative grounded theory study: 1) the data, i.e., the validity, reliability, and credibility of the data as inputs to the research process, 2) the theory itself, i.e., the credibility of the output of the theory-development process, 3) the adequacy of the research process through which the theory is generated, focusing on analysis methods, and 4) the empirical grounding of the research, i.e., the grounding for the resulting concepts and theory in the data. The previous sections on selection of research sites and data collection methods cover criterion 1. For example, the selection of contrasting sites and collection of data using multiple methods from multiple sources ensures the validity, reliability, and credibility of the data (Miles & Huberman, 1994). The following sections on data analysis and theory building methods describe how my study met criteria 3 and 4. The resulting process theory and coverage of criterion 2 are presented in later sections.

3.6.1.5 Data analysis

My research objectives were to find the processes by which exercise of power affect creation of a working IS. In other words, the intention is to build a longitudinal process theory as opposed to a variance theory (Van de ven, 2007). Unlike variance

models, process models do not identify causal factors and predict outcomes, but instead explain how the process unfolds, identifying the mechanisms that move it along. Explanatory process theories explain an event by neither predicting what will happen (e.g. variance theories) nor describing what did happen (e.g. descriptive case studies), but by identifying the mechanisms that generate what we observe in the empirical domain. Grounded theory is especially meant for building such longitudinal explanatory process theories that focus on social processes (Glaser & Strauss, 1967). Therefore, I employed grounded theory to perform data analysis and build the theory.

3.6.1.5. 1 Data analysis and coding

Concurrent with grounded theory and the qualitative case study approach, the data collection and analysis occurred iteratively. As field notes and interviews were transcribed, they were coded. However, while I was in the field, I did the coding manually and briefly. I could not perform a detailed coding and analysis at that point in time. I performed the detailed coding and analysis only after I got back to Cornell from my field. The detailed analysis followed Strauss and Corbin's (1998) recommendations for open, axial, and selective coding. I coded my field notes (research journal), memos I generated in the field, most of the archival data including emails and excluding some company documents such as manuals that were not significantly relevant to the research, and all interview data. Specifically, each passage (from one to several sentences in length) in every interview was assigned one or more codes reflecting what I perceived the speaker to be talking about. The code labels were the words used in the interviews (code in vivo) or were suggested by them. For example, below in Table 3.3 (next page), is an interview excerpt from my interview with a production supervisor along with the codes:

TABLE 3.3: AN ILLUSTRATION OF CODES

Interview excerpt	Codes
The main point is the visibility to the (group's) owners so that they can control things from there. They sit far away from us. As owners, they need to know so many things such as the variation in production, profitability, production turn over, etc. If they can come to know on real time basis, they can trace and control things better. ERP provides that visibility.	***Open codes:*** visibility to the owner, visibility to the management, owner's control *Family: visibility to the owners* *Super family (subcategory): visibility to the management* ***Axial codes:*** "real time visibility through traceaility", "visibility to owners for controlling purpose", "owner's virtual control through increased visibility" Category: visibility increaser; increaser of discipline ***Selective code:*** *Category: disciplining tool* *Core category: technology frame*

During open coding, I coded this passage in many ways such as "visibility to the management", "visibility to the owners", "owner's control". These are called concepts. I grouped all similar concepts (e.g. "owners' expressed desire to gain more visibility") under a family "visibility to the owners". Similarly, I had another family named "visibility to the top management". Clubbing these two families together I formed a super family, named "visibility to the management" (see figure 3.1, next page).

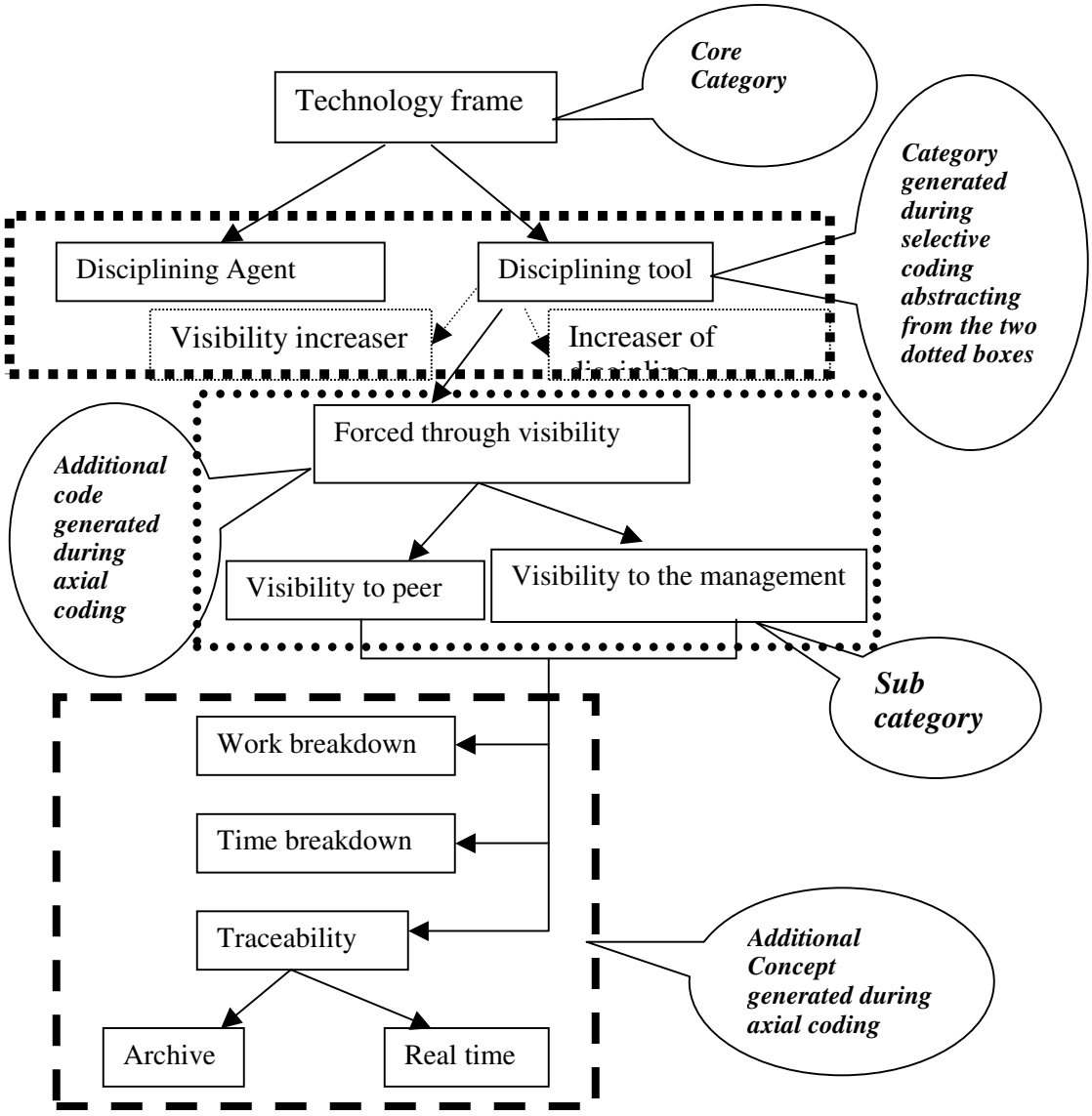

FIGURE 3.1: AN ILLUSTRATION OF THE CODING PROCESS

I used Atlas-ti 5.0 software package to track the coded interviews and field data. These super families formed subcategories. Theory development occurred iteratively with coding. Thus, as coding progressed, I organized codes into families and trees (for examples, see figure 3.1), compared similarly coded passages to generate more abstract theoretical concepts, and wrote memos to propose abstract concepts and

potential relationships. Field memos formed the part of these memos. Next, I describe these steps.

During the open coding stage the codes were primarily substantive, mostly using the vocabulary of the interviewees, e.g., "visibility to the owners", "expected change". As concepts emerged from the open coding, I started categorizing them and grouping them into families (e.g. "visibility to the owners") and super families (e.g. "visibility to the management"). The super or super-super families (depending on the levels of break down) are called categories (Strauss & Corbin, 1998:114). In my case super-super families were categories. For example, I had "visibility increaser" as the category at this point in time. At this point in time, I grouped the super families of "visibility to the management" and "visibility to peers" (subcategories) under two super-super families, named "visibility increaser" (category) and "disciplining tool". This is the inductive part or forward moving. The open coding stopped here. Then I proceeded to axial coding, which is more deductive and backward moving. Strauss and Corbin (1998) recommend axial coding once a phenomenon (category) is identified and further explanation is desired. Similar to Glaser's (1978) recommendation of coding around a core category (or subcategory), I started axial coding once open coding had uncovered phenomena of interest (category or subcategory), in my case, for example, visibility to the management (subcategory) and visibility increaser and increaser of discipline (category).

I followed Strauss and Corbin's (1998) axial coding recommendations, but treated this technique as a method through which to discover the relationships in the data, rather than as a set of restrictive rules. This was to avoid Glaser's concern that axial coding could be overly restrictive, with questions emanating from the researcher rather than

the data (Locke, 2001). Suddaby (2006) expressed similar concerns, noting that grounded theory techniques require active interpretation by the researcher, not mechanical application of techniques. I used Glaser's (1978) dimension family, i.e., coding for different types within a category or subcategory, for example different types of anticipated changes (by implementing ERP). As an example of my axial coding, consider the same excerpt I reproduced in table 3.2. Now I coded the passage around the subcategory, "visibility to the management". I generated additional codes such as "real time visibility through traceaility", "visibility to owners for controlling purpose", "owner's virtual control through increased visibility". Similarly, during axial coding, I coded a passage as "discipline forced through visibility" (which formed a subcategory) during open coding (see figure 3.1). In relation to this new code, now I had additional codes (that formed subcategories) such as "visibility to peer", "visibility to managers", "visibility to the top management", and more specifically visibility to peer that occurred by increased breaking down of work ("work break down") or increased breaking down of time of execution ("time break down"), which were concepts. In this manner, I went through each super family and family of codes, re-checked whether the codes within the family (and super family) belonged to that particular family, and coded further (axial codes) to show its relationship within the family (or categories) with the subcategories. To avoid the risk of fitting data into a pet theory (Glaser, 1998), I deliberately sustained a willingness to reassign the codes to a different family (or super family or super-super family) or even to change its label. I did make such changes.

After axial coding of the interview and field data, the code list had expanded to 895 codes. This large number of codes reflects two characteristics of my coding process. First, because I did not know what theory might emerge from the data, I coded broadly

to cover several possible theoretical approaches to understanding role of exercise of power to create social consensus about technology and implementation. Second, perhaps, I coded for more depth than needed for the resulting theory, e.g., 68 codes were labeled consequences with some qualifier such as time, workload, visibility, and master scheduling. Although such detailed coding was useful in the constant comparison process, not all of it contributed to the resulting theory.

3.6.1.6 Theory Building

Theory building starts with selective coding. Selective coding is a process of integrating and refining categories with the goal of building and refining theory (Strauss & Corbin, 1998: 143-147). Selective coding moves the analysis from a potentially large number of codes produced from axial coding to a few theoretical categories, called central categories or core categories that form the foundation of a new or revised theory. Theory emerges basically through finding the relationship between core categories. Selective coding involves integration and abstraction through comparison of coded passages, as well as comparison to the literature. To facilitate this process, I used Atlas-ti to produce various reports of all the text coded with particular subsets of the axial codes. I then read and reread these reports, comparing coded passages to each other both within and across categories for similarities and differences in order to re-group them and identify the core category that they represent. Going through the memos (in which I had written the possible relationship between categories or concepts) and comparing the coded passages, I built relationship between core categories. For example, I abstracted the "visibility increaser" and "increaser of discipline" to "disciplining tool" after I went through more codes generated during axial coding that expressed the effect of visibility increase as a disciplining by the management via ERP software. Thus, at this point in time, I had

only one category, disciplining tool (in place of the earlier two categories). Further, I labeled "discipline" as a core category (see figure 3.1) around which two types of ERP images were projected during period 2 in the multinational organization. This core category was related to other categories through the notion of "technological frame" that I came across during my comparison of the categories with concepts in literature. Thus, the theoretical framework was about the change in technological frame that occurred across different periods interactively with the exercise of power. The theory that I describe later explains how the change in technological frame interacted with the exercise of power by relating the core categories under the notion of technological frame with the core categories under the notion of exercise of power.

I moved back and forth from selective coding to axial coding. This generated more relationship between codes. For example, take the category "visibility to the top management" (see figure 3.2 on the next page). "Visibility to the top management" has 12 sub categories. For the sake of explanation, I have exploded the relationship between codes in the sub category of "work break-down" under the category of "visibility to the top management". Work breakdown has three members, which are interrelated. For example, management's intention to gain more visibility into subordinates' work (coded as "management's intention for visibility") led to management's interest in embedding a more work break-down view in the software (coded as "management's interest in work break-down").

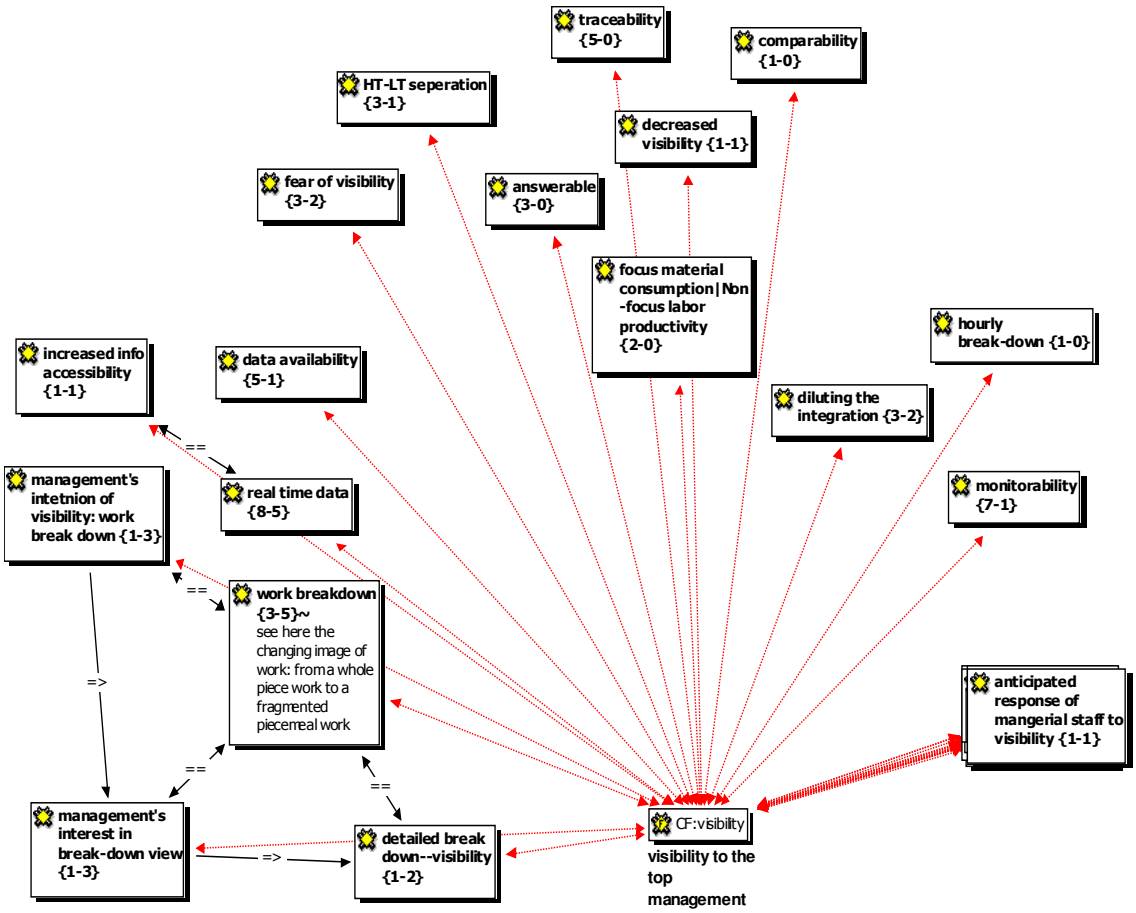

FIGURE 3.2: SAMPLE RELATIONSHIPS WITHIN CATEGORIES OR SUB CATEGORIES

When a task was broken down into minute details and coded into the software, it resulted in an increase in the visibility of the subordinates' task-related action to the superiors (coded as "detailed break-down—visibility"). In figure 3.2, I have not shown all the relationship and connections since my intention is just to make explicit how I used grounded theory method in my study. The abstraction to higher levels and the relationships forms the body of the theory. Further, since my intention was to understand how the exercise of power leads to the evolution of social consensus about technology and implementation over time, I separated the codes with respect to the

time period in which the described phenomena occurred. For example, in figure 3.1, the category "disciplining tool" is an image of ERP that emerged during a particular time period of ERP implementation in WestIndia. Similarly, during different periods different images of ERP were projected and in turn translated into the software. I assigned the codes into different time periods based on two criteria: a) the time at which the interview was conducted (for example, I had asked most of my interviewees about their image of ERP during each time I interviewed them: I had multiple interviews of a single individual that spanned nearly the complete span of my fieldwork: see table 3.2), and b) I also separated them based on the time that the speaker (or the author of the text in case of archival data) attached to the image of ERP that they were explaining or the time a particular email or memo was circulated that projected the image of ERP under consideration. This helped me to map the change in the sensemaking of various actors and the processes involved in the evolution of consensus making over time.

3.7 Conclusion

Table 3.4 (on next page) gives the summary of what I have described so far including the theoretical background that I used for formulating my research question.

TABLE 3.4: RESEARCH PERSPECTIVE AND CHOICES (adapted from Walsham 1993)

Research perspective	Choice
Topic	IT-enabled modernization efforts
Overall premise	How does the exercise of power affect creation of a working information system from a standard technology package
Ontology	Social construction of reality
Epistemology	Interpretive
Methodological approach	Understand the context and process of technology and organizational change through an interpretive field study
Research strategy	Qualitative case study overlaid with grounded theory
Research methods	Interviews, observations, review of archival
Research site -- focal level	Western private multinational manufacturing organization & local public manufacturing organization in South India – organizational level
Detailed unit of analysis	Negotiations around work practices
Theoretical grounding	Organizational theories of power; Sociology of technology
Topic	IT-enabled modernization efforts
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Research methods	Interviews, observations, review of archival
Research site -- focal level	Western private multinational manufacturing organization & local public manufacturing organization in South India – organizational level
Detailed unit of analysis	Negotiations around work practices
Theoretical grounding	Organizational theories of power; Sociology of technology

Given the explanations of how I conducted my field study, in the next chapter, I define and explain the key terms I use in this study—technology frame and cross-cultural context. Further, I illustrate how I used grounded theory to evolve technology frame.

CHAPTER 4

TECHNOLOGY FRAME IN A CROSS-CULTURAL CONTEXT

The objectives of this chapter are to define and explicate the two key terms I use in my study. The key terms, as the title of this chapter indicate are technology frame and cross-cultural context. I explicate the terms by showing how I abstracted these theoretical concepts from my empirical data. This will reveal how the key terms are grounded (Glaser & Strauss, 1967) in empirical data. In turn, it will also illustrate my use of grounded theory method. In addition to presenting the link between the abstract concepts and the empirical data, I also briefly describe the industrial and institutional environment of the State (especially during 2000-2008) in which the ERP implementations took place. The expected result is a smooth transition from the abstract world of literature review, research question, and methodology that we dealt with in the previous chapters to the empirical world of implementation case studies that the following two chapters address.

4.1 Technology frame: Developing a central category

In this section I explain and illustrate the development of the 'central category' (Strauss & Corbin, 1998), the key concept that I use as the building block to build my theory that will answer my research question (Glaser & Strauss, 1967).

In figure 4.1, I illustrate the development of the central category. As I mentioned in the previous chapter, to develop the central category I followed Strauss and Corbin (1998). Initially, I generated concepts through open coding (step 1 in figure 4.1). Subsequently, through axial coding, I abstracted from these concepts that resulted in categories and their relations with sub-categories (step 2 in the figure). During axial

coding I also generated more concepts, subcategories, and categories. I abstracted further, through selective coding to generate the central category that relates the categories (step 3 in the figure). My central category is technology frame (step 4 in the figure).

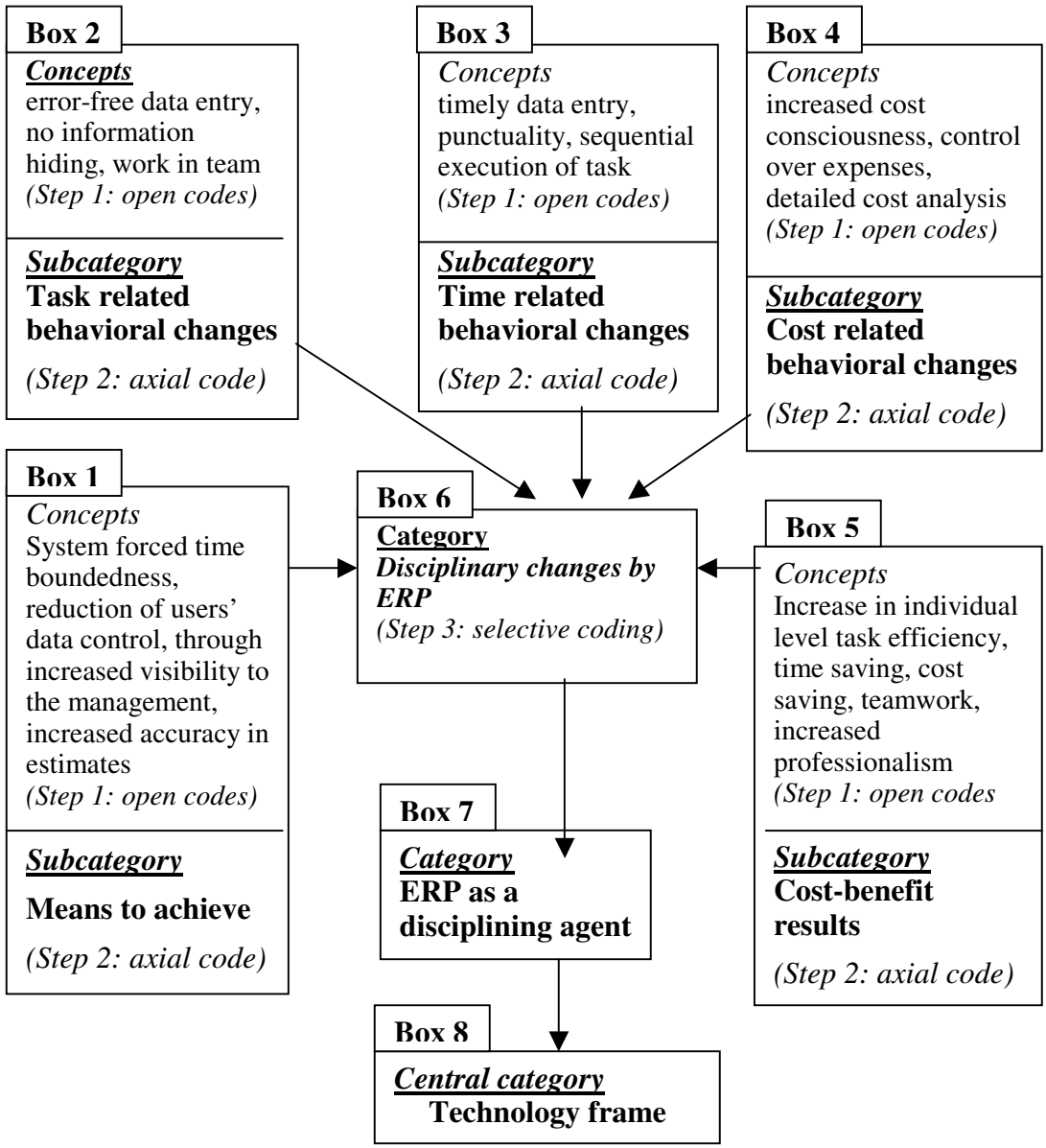

FIGURE 4.1: BUILDING THE CENTRAL CATEGORY: TECHNOLOGY FRAME

Now, let us consider the details of the steps. In figure 4.1, consider box 1. The concepts such as error free data entry, no information hiding, and teamwork across the departments were all task related behavioral changes that the employees expected would happen (or felt as happened) by implementing the ERP. Therefore, I grouped them together as task related behavioral change, which formed one sub category. To make clear how I generated the concepts such as error free data entry, in table 4.1 (next page), I have given representative quote for each concept in box 1, frequency of such quotes, and the sources of such quotes. I also have given the frequency of quote considering each open code separately. The table shows the density of grounding that the open codes have. As we move up in abstraction from open codes to axial code and further to selective code, the density of grounding also increases since the total number of quotes grouped under the code increases.

TABLE 4.1: SAMPLE QUOTES FOR THE OPEN CODES

Open code	Sample quote	Frequency of quote	Sources of quote
Error free data entry	In the old system (TIS) if we forgot to enter a requisition, I could easily trace it and edit it. This ERP does not give me anything like that...no error allowed in the data entry…. to deal with ERP we need to be perfect without any mistake	30	Employee conversation, Interview, meetings
No info. hiding	We not only did not share the information but hid it from others..for example,..now, it's no more possible..system makes it visible..no hiding of the information	25	Employee conversation, Interview
Teamwork across the depts.	There was no teamwork. All works are in individual depts. When will the teamwork come? When we share the data. This is what ERP does. If I don't share my design data, the other person also will do the same….Now, there will be and are more discussion and a team work.	32	Interview, meetings
Frequency of quote for open code: minimum-3, average-10, maximum-30			

Now, I turn back to figure 4.1. Similar to task related behavioral change, there were time related behavioral changes (box 3), and cost related behavioral changes (box 4). Since the employees interpreted these changes as a part of a new discipline that the ERP was bringing, I grouped these changes under disciplinary changes (box 6), which is called an axial code. Then, other comments of the employees that resulted in the concepts presented in box 1 and box 5 made sense. These concepts were means the ERP used or the management used via ERP (box 1) to achieve the disciplinary changes and the resulting costs and benefits (anticipated and felt) (box 5) of such changes. Therefore, I confirmed the label "disciplinary changes" as the axis (result of axial coding). Underlying the disciplinary changes was an image of ERP: ERP as a disciplining agent. In sum, now we have a) an attributed meaning (or image: ERP a disciplining agent, see box 7) of ERP that implied an objective of ERP implementation—disciplining user behavior, b) means to achieve this objective through ERP implementation (example of one such means is system forced time boundedness, see box 1), c) expected or felt behavioral changes by application of these means (example of one such changes, specifically temporal changes is timely data entry, see box 3), and d) expected or actual results in terms of cost-benefits of such changes (example of one such results is increase in individual's task efficiency, see box 5). In the next step (selective coding), I compared and contrasted these four aspects with other families of codes. I found similar relationship repeatedly emerging in other families too. As Strauss and Corbin (1998) suggested, I compared this repetitive phenomena with the theoretical concepts available in technology implementation literature and organizational cognition literature in order to check whether any concept could represent this repetition effectively. I considered "frames of meanings" (Collins & Pinch, 1982), "cognitive maps" (Bougon, Weick &

Binkhorst, 1977; Eden, 1992), “frames” (Goffman, 1974), “interpretive frames” (Bartunek & Moch, 1987), “interpretative schemes” (Giddens, 1984), “mental models” (Argyris & Schon, 1978; Shutz, 1970), “paradigms” (Kuhn, 1970; Sheldon, 1980), “scripts” (Abelson, 1981; Gioia, 1986), “thought worlds” (Dougherty, 1992), and “technological frames” (Bijker, 1995; Orlikowski & Gash, 1994). I found technological frame, which I shortened as technology frame, as the most suitable concept that would tie the four different aspects together (i.e. category-subcategory relationship) as well as the different meanings or images of ERP (categories) that emerged over time. The different images of technology emerged over time, in other words the categories, were manifestation of shift in technological frame. Therefore, technological frame could connect the categories (see box 8, step 4). In the following paragraph, I explain why I found technological frame as the most suitable concept.

The literature on Social Construction Of Technology (SCOT) discusses technological frame in the context of technology development (e.g., Bijker, 1995) in a community. The Information Systems (IS) literature discusses the same concept in the context of IT implementation in organization (e.g., Orlikowski & Gash, 1994). In both literatures technological frame is defined as a socio-cognitive device used for collective (as well as individual) sensemaking. Common to the definition of technological frame in both literatures are the assumptions (for example, the image or meaning attributed to technology), the knowledge (for example, working of the technology), and the expectations (for example, anticipated changes) that those who are involved in the technology development or implementation use to understand technology. In my representative sample, we can find these three dimensions. For example, the data suggests an image of ERP, anticipate or felt behavioral changes, and how ERP would function (for example through increasing accuracy in estimate) in order to facilitate or

bring about such changes. While SCOT defines technological frame broadly (which includes the technology itself, tests, procedures, etc. see Bijker, 1995), in IS literature the dimensions of technological frame are narrowly specified as a) an image of technology that reveals the actors sensemaking about the nature of technology and its capability, b) the reasons for implementation of technology, and c) the conditions in which technology will be used and the consequences of such use. Both the literatures mention that one may not find all dimensions of technological frame in the empirical study except the essential element of technological frame, the meanings or the images that actors attribute to technology. Given that technological frame is defined as a collective (as well as individual) sensemaking device, the essential dimension—meaning attributed to technology-- and the elements of technological frame such as assumptions, knowledge, and expectations are consistently observed in my data, and that categories can be connected to each other as shift in technological frame, technological frame is apt to abstract from the categories that I interpretively identified in my data. Therefore, I chose technology frame (a shortened version of technological frame) as the central category. In the following paragraph, I explain the central category, technology frame, starting with a more general concept frames of reference.

The frames of reference held by organizational members are implicit guidelines that serve to organize and shape their interpretations of events and organizational phenomena and give these meaning (Moth & Bartunek, 1990; Weick, 1979). Borrowing the concept of "schema" from cognitive psychology (Bartlett, 1932; Neisser, 1976), an individual's frame of reference has been described as "a built-up repertoire of tacit knowledge that is used to impose structure upon, and impart meaning to, otherwise ambiguous social and situational information to facilitate understanding" (Gioia, 1986:56). Literature in organizational cognition has extended

the idea of individual cognitive structures to groups and organizations (Calder & Schurr, 1981; Gray, Bougon, & Donnellon, 1985). A variety of terms has been used to convey the idea of shared cognitive structures, including "cognitive maps" (Bougon, Weick & Binkhorst, 1977; Eden, 1992), "frames" (Goffman, 1974), "interpretive frames" (Bartunek & Moch, 1987), "interpretative schemes" (Giddens, 1984), "mental models" (Argyris & Schon, 1978; Shutz, 1970), "paradigms" (Kuhn, 1970; Sheldon, 1980), "scripts" (Abelson, 1981; Gioia, 1986), and "thought worlds" (Dougherty, 1992). In the context of the organization, frames refer to "definitions of organizational reality that serve as vehicles for understanding and action" (Gioia, 1986: 50). They include assumptions, knowledge, and expectations, expressed symbolically through language, visual images, metaphors, and stories. Frames are flexible in structure and content, having variable dimensions that shift in salience and content by context and over time. They are structured more as webs of meanings than as linear, ordered graphs (Gioia, 1986). The essential element of a frame is its interpretive meaning.

Based upon the above-discussed literature and following IS scholars, I define technology frame as a subset of actors' frames of reference (cognitive structure) that concerns the assumptions, expectations, and knowledge that actors use to understand technology in organizations (Orlikowski & Gash, 1994:178-179). As a subset of frames of reference, technology frames share the properties, dimensions, and uses of other frames. While, the IS literature specifies use of technology frame as cognitive (a cognitive device for sensemaking) (Davidosn, 2002; Orliowski & Gash, 1994), SCOT literature suggests one more use, political: a political device to create a shared consensus through persuasion. But, SCOT literature does not define technology frame as a political device per se. However, in the following chapters, I show that technology frame is used as an emergent discursive resource for sensegiving. Therefore, I will

argue that technology frame has a political use. In the following chapter, I use technology frame—the central category—as an interpretive frame (Bartunek & Moth, 1987) to describe and analyze the two ERP implementations that occurred in a cross-cultural context.

4.2 Meaning of cross-cultural context

In the literature review, I have mentioned a consistent argument that the sociologists of technology have made so far. That is technological artifacts (such as ERP) come to embody the culture and social knowledge of the space (or locale) and the time in which it is created (Dubinskas, 1988, 1988a; Latour, 1988; 2005; Walsham, 2003; Van de ven, 2005). I also mentioned that scholars have either implied or argued that since ITs such as ERP (Soh et al., 2000) and GIS (Sahay, 1998) have originated and designed in the West, they have embedded Western culture. When such technologies with embedded Western culture are implemented in non-Western social context, they may encounter a different culture (Sahay, 1998). This is called a cross-cultural encounter. Instead of following the general argument that ERP may have embedded Western culture and that the local organizations may have a different culture, I analyze the cultural notions underlying the standard practices preprogrammed into ERP software (i.e. ERP's global practices) and the cultural notions underlying the organization's local practices. Since ERP is basically a software that has preprogrammed standard work practices, I focus only on the work practices. Within this boundary of work practices, I focus on the temporal norms that are manifest in the enactment of the organization's work practices ("local practices"). I focus exclusively on the temporal norms since they came up as the most interesting and crucial aspects of organizational change (i.e. the change in organization's local practices vis-à-vis ERP's global practices) during ERP implementation in WestIndia. These temporal

norms were in contrast with the temporal norms that underlie the ERP's global practices. Therefore, the explication of the temporal norms embedded in local practices will lead us to the cross-temporal context, a dimension of cross-cultural context (Sahay, 1998; Trice, 1993), in which the ERP implementations occurred.

4.2.1 Analysis of local work practices in WestIndia: The enactment of local temporal norms

As part of the production planning, in WestIndia, the Production department had weekly targets in terms of number of pieces, due dates, and start dates. But, start dates were flexible, however, and each production supervisor had the discretion to decide start date. Many times supervisors would depart from the planned start date with the informal approval of the production manager. According to the production documents, there was recurrent slippage in hitting due dates. It was taken as "normal" to slip due dates by 5-8 days. In an interview one manager commented: "When the job order goes to production area it is very *flexible* there. Assume five orders go to production (as per the weekly schedule]. They (supervisors] may take up one while the other may be taken two days later, estimating that we can complete it even if we start it two days later. If we slip by a week, nobody cares."

Some times the slippage went even up to 2 weeks without much questioning from the top management. Thus, both the start time and the finish time were taken to be *flexible and evolving through negotiations* among the production staff and between the production department and other departments, such as Sales and Purchase. The historical context might reveal the reasons for these slighted and unquestioned delays. Also, the historical context described in the next few paragraphs depicts the evolution

of two existing practices[7] (different from the ERP practices) that seem to embody local temporal norms, which are different from the temporal norms that underlie ERP's global practices.

4.2.1.1 Customer push-in

Consider figure 4.2 (next page). During the inception periods, without checking[8] the availability of material and machines, WestIndia used to accept all the orders it could get. Many times when a customer promised date approached, WestIndia would *negotiate* with the customers--mostly Indian--to get extension on delivery dates. Here, note that time is taken to be *flexible, negotiable, and constructed* between two parties (Adam, 1990; 1995). This 'successful' negotiation strategy was continued for ten years, which resulted in a practice of taking up the most "pressing" customer's orders first for manufacturing, stopping ongoing manufacturing. Employees referred to this practice as "customer push in", which disrupted the planned temporal order in which customer orders should have been taken up. The resultant delay in hitting the targeted completion date of production of the ongoing orders got carried over to the following periods. Over time, this "customer push in" with its associated disturbances in the temporal order became a normal practice.

7 Existing practices means the practices in WestIndia that existed before the implementation of the ERP technology

8 There was an intuitive cursory check that the Production manager performed. But, there was no detailed checking. Later, I explain why there was no detailed checking.

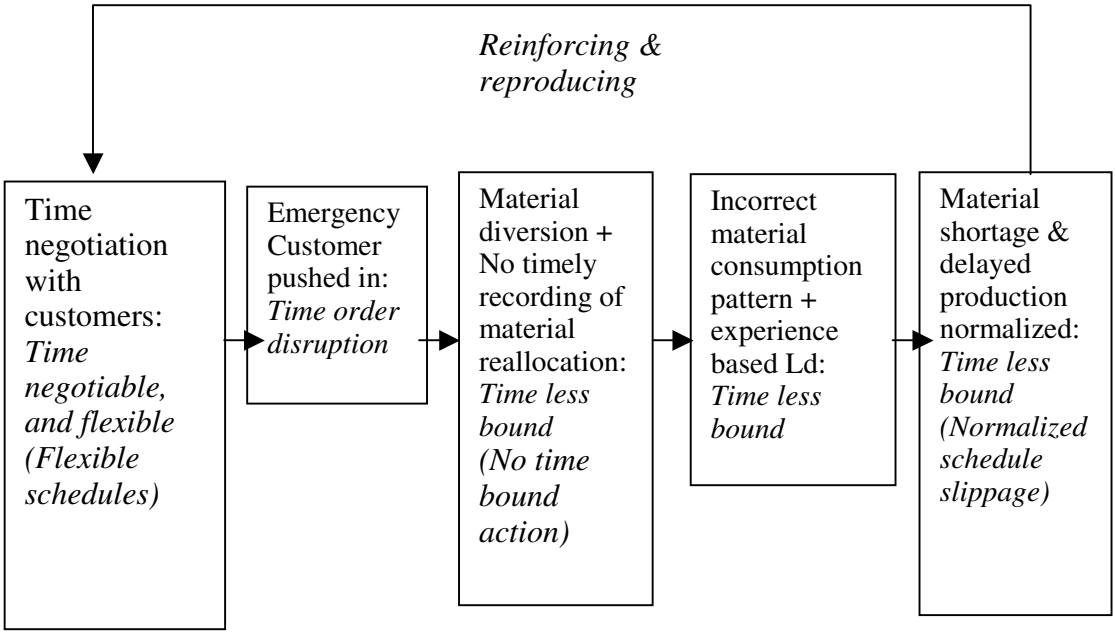

FIGURE 4. 2: TEMPORAL NORMS EMBEDDED IN WESTINDIAN LOCAL PRACTICES AND THEIR ENACTMENT

4.2.1.2 Material diversion

As figure 4.2 shows, the customer push in led to another practice—material diversion. The raw materials for manufacturing were issued from the Store after being recorded in the existing information system, called EIS against product ID (transformer number). Whenever the pushed-in orders were taken up for manufacturing, since there were no planned raw materials in the inventory stock against these orders[9], the materials issued against the planned orders were diverted on the shopfloor towards the manufacturing of the pushed-in orders. Material diversion was also normalized. Surprisingly, the reallocation of materials that occurred in diverting materials was

[9] WestIndia had an inventory policy of keeping low volume of stock partly due to physical space constraint.

usually recorded in the EIS many days after starting the production. Sometimes, it was not recorded, apparently showing 'indifference towards time' (Sahay, 1998). Partly, this led to the generation of incorrect material consumption patterns resulting in wrong estimation of the quantity of the material required, and consequently ended up in raw material shortage. The lack of accuracy in the material lead-time (Ld)[10] estimation worsened the situation. The Ld estimation rested on the experience of the purchase manager, implying that time is not some thing to be externally (to human beings) recorded and analyzed (Sahay, 1998). However, this resulted in raw materials not being available in time to start production, which in turn, led to production delays. The production delays pushed WestIndia to again negotiate with the customers, reinforcing the temporal norms that take time as negotiable and flexible.

Next, I analyze the third practice that employees called as "sequence jumping", which is skipping some steps in sequence or not adhering to the linear sequence against the expected adherence to sequence while enacting a practice.

4.2.1.3 Sequence jumping

"Sequence jumping" pervaded many enacted procedures in WestIndia. Here, for the sake of convenience, I describe a simplified procedure. Consider the enactment of the steps from customer order arrival to starting of production (see Table 4.2, next page).

[10] Material lead-time: It is the period between the time the purchase order for a material is placed and the time it is received at the Store.

TABLE 4. 2: LIST OF WESTINDIAN ACTIVITIES

Connection	Activities
a	Order arrival
a-b	Order firming up (Sale manager)
b-c	Posting firm order to Production (Sale Manager)
c-d	BOM preparation & Control plan preparation (Sales Engineer)
d-e	Transfer of BOM and control plan to Production (Sales Engineer)
e-f	Preparation of Material list and transfer to Stores (Production Engineer)
f-g	Issue of material to shopfloor (Store staff)
f-f'	Re-check for man-machine availability (Production staff)
g	Start production

Figure 4.3 (read with table 4.2) shows the expected enactment as per the ISO document[11]. Employees were expected to strictly adhere to this sequence, which has a linear flow. Compare this with the actual enactment in figure 4.4.

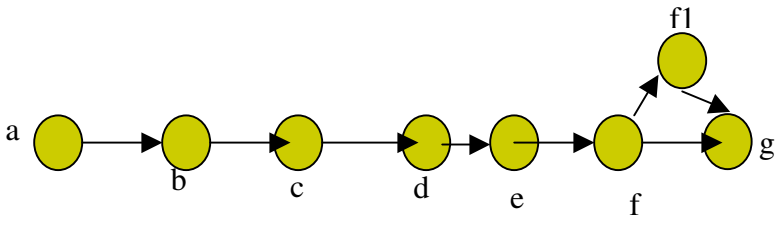

FIGURE 4.3: EXPECTED ENACTMENT: LINEAR SEQUENTIAL FLOW AND EXPECTATION OF SEQUENCE ADHERENCE

[11] There are a few more simultaneous steps, which are avoided for the sake of simplicity.

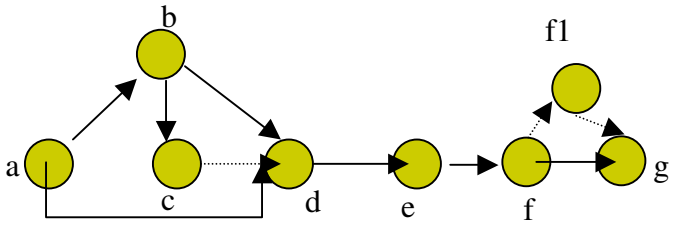

FIGURE 4.4: ACTUAL ENACTMENT: NETWORK FLOW & SKIPPING OF STEPS (LACK OF SEQUENCE ADHERENCE)

Browsing figure 4.4 (read with table 4.2), in actual enactment we can see two (or more) tasks done simultaneously along with skipping of some steps. This results in a network flow of tasks (as opposed to a linear flow). I describe how it usually occurs in WestIndia. The manager1 who sat next to the production manager would tell him that a customer order arrived and the changes the manager1 *would* make in the control plans (no posting of firm orders and no control plan prepared). From this conversation the production manager would guess the change in the materials to be issued (no BOM prepared). Immediately, the production manager would dictate the material requirements to the engineer sitting next to him. The engineer would prepare the material list and would post it to EIS at his convenience but usually within a day. Simultaneous with the posting, the engineer sends an operator to pick up the materials. Usually, the engineer did not expect the operator to return with the material within a strict time period such as an estimated standard time for such movements. Instead if the operator returned within a "reasonable time period" that varied from twenty minutes to an hour, it was considered normal. Interestingly, there were no standard time estimates available for such transportation movements. The operator who goes to

the store chats with the employees at the store and returns with no signal of haste. Once the materials are on the shopfloor, without any recheck of man/machine availability, the production would start. Meanwhile the Sales manager confirms the order and posts it to production. Sometimes, the BOM and new control plans would not be prepared at all. Thus, activities c-d and f-f1 are skipped. We can see the sequence jumping, which was a *normal* practice, evident in other examples that I describe later

One may think that sequence skipping is merely an issue of change of (or deviation from) the order in which tasks are to be done (or spaced). But, adherence to sequence or sequence fixing, when it is ordering the activities carried out has temporal orders (Schriber & Gutek, 1987; Zerubavel, 1981) since activities encapsulate time. By fixing the sequence, the activity gets fixed both in space (i.e. its position in the sequence), and in turn, in time (i.e. the following activity can occur only after the previous activity is finished[12]) (Giddens, 1984; Sahay, 1997). While the sequence skipping avoids a linear imposition of temporal order, the adherence to sequential pattern of procedural action imposes a linear temporal order (Kallinikos, 2004). By fixing the position, the possible pattern of activity occurrence in time (for example, at any time A will always follow B) is also fixed and made easily predictable and controllable. Put differently, time is bound (time boundedness) and made controllable through binding space.

In sum, in the enactment of WestIndia's local practices, time was perceived flexible, negotiable, non-linear or networked, and less bound (e.g. lack of timely recording).

[12] This is particularly applicable in this case since there are no portions of activities done in parallel.

The enactments of these temporal norms were schedule slippages, simultaneous execution of two or more tasks, lack of adherence to sequential pattern of action, and lack of time bound action. These temporal norms, to a significant extent, reflect the historically salient temporal norms in Indian society as they have been depicted in the literature.

4.2.2 Historically salient temporal norms in India

In this section, I go through the historically claimed[13] so-called "traditional" Indian temporal norms (as opposed to the so-called Western temporal norms). Agreeing with the critique of the cognitive-cultural dichotomization of time as Indian vs. Western (see Munn, 1992), I do not claim the traditional temporal norms or assumptions as the only way Indians perceived and correspondingly enacted time. Instead, based on the literature available, I assume that the traditional temporal norms were made more salient (from a possible set of all temporal norms that Indians had been practicing). Perhaps such traditional temporal norms were more predominant among the powerful (e.g. Brahmins) of the Indian society at that point in time.

Here I give only a brief description of the traditional assumptions based on Sahay's (1998) detailed account. In religious Hindu[14] literature, time is symbolized as an unending stream of life and death. Paniker (1976) describes the vision of time in India to vary according to whether it is treated as power, the self, or a divinity. In Vedic literature, time is discussed as the fruit of ritual action. The unfolding of time was something which man *created* (as opposed to an objective view) in close collaboration

[13] I put it as a claim since what is projected as Indian tradition is a Brahministic tradition, which was traditionally the most influential cast in Hindu religion.

[14] Hindu (including its variants) is the major religion in India (80.5 %). Other major religions are Muslim (13.4.%), and Christian (2.3%) (see: http://www.india-travel-agents.com/india-guide/religion.html)

with the Gods. Another view of time is one based on the absolute principle of fate. Quoting from the Vedas, Paniker (1976) describes this view of time as eternal and non-controllable. In this view all reality depends on time, one that cannot be controlled--an uncontrollable fate. In a similar vein, while discussing fatalism in India, De Reincourt (1960) argues that the key to an understanding of Indian culture lies in realizing its indifference towards history and the very process of time. This indifference, De Reincourt (1960) suggests, eliminates the concern for immediate time, and thus the study of eternity takes precedence over the present. In addition, Indians often deal with cosmic, astronomical time that takes time as transcendental and goes to abolish the present, empirical time. Transcendental time tends to dominate immediate or empirical time where it is often the deed, the human or divine action, which determines the structure of time. In short, historically in the Indian Hindu tradition -- the predominantly practiced tradition in India-- time is assumed to be eternal, uncontrollable, and transcendental. This is in contrast with the so-called Western assumptions about time that conceptualizes time more as transient, controllable, non-negotiable, rigid, and immediate or empirical (Sahay, 1998). In the following section, analyzing the fundamental processes embedded in ERP software, I argue that ERP embodies the so-called Western temporal norms that normally an ERP user has to enact when the user uses the software. Acknowledging the contested nature of the term "Western", I use the label global instead (which means globalized through ERP or claimed to be global by ERP promoters).

4.2.3 ERP's global temporal norms

First I describe how temporal norms are reflected in the mainstream ERP discourses[15]. ERP is generally described as both a business solution that provides globally valid "best business practices" and an IT solution that integrates various functional systems in an organization (Mabert et al., 2000). As an integrated Information System (IS), ERP replaces disparate silos of existing traditional ISs in an organization, and simultaneously standardizes existing organizational practices replacing most of them with the ERP's in-built globally valid "best" practices (Wagner et al., 2006). The objective of the integration and the *standardization* is to *increase data processing efficiency* through *increasing the speed* of data processing, and in turn to *reduce cost* (Davenport 2000). ERP fits squarely with Pickles' (1995: 85) description about new electronic technologies: "(N]ew electronic technologies permit the extensive surveying of new and more complete sets of data at *great speed*, *decreasing cost* and *greater efficiency*…also permit the *standardization* and manipulation of a variety of discrete data sets ..that can be codified and even commodified. This control technology and knowledge engineering require special skills, knowledge and training. The output is in great demand, students can find good jobs, and government, military, and business applications provides challenge for the university researcher". The above example on the use of language to describe ITs like ERP reflects instrumental rationalistic assumptions of efficiency, standardization, and market-driven skills. It is also implied that time can be controlled by task wherein specific discrete data sets are standardized, codified and commodified at 'great speed' and 'decreasing cost.' Most of the academic studies (recent reviews: Moon, 2007; Esteves & Bohoquez, 2008) as

[15] Following Foucauldian literature, I consider a discourse as an institutionalized way of thinking, a social boundary defining what can be said about a specific topic, or, as Butler (1999) puts it, "the limits of acceptable speech". I locate it by checking for the patterns of communication (textual and non-textual)

well as practitioner literature (see the websites of ERP vendors, e.g. http://www8.sap.com; Davenport, 2000) on ERP implementation from a system engineering perspective have emphasized the reduction in time and the resultant increase in efficiency (Wagner, 2004). In short, the discourses claim one of ERP's main benefits to be an increase in process efficiency through control of time and cost, two important resources. This control is achieved through three basic processes built into ERP software: standardization, optimization, and integration. In the next two paragraphs, I explain the temporal norms that underlie these processes inscribed in ERP. I start with standardization.

The objective of standardization is to reduce variability, and thus, make the entity (data) controllable and easily predictable. For example, as in Scientific Management, time for executing a task (broken down to minute levels) is standardized (called standard time) resulting in more controllability and predictability. Scholars have written elaborately on standardization process and the implicit assumptions of controllability and predictability (see Bowker & Star, 1999; Hatling, 1996; Hanseth, Monteiro, &). The same concerns underlie optimization. Here, the overall objective is to complete a transaction within optimal time and optimal cost. Thus, time and cost are taken as two key variables[16] in the models of mathematical optimization that reside inside ERP. The very idea that time is a resource to be optimized is based on the assumption that time is controllable, finitely measurable or empirical, and expendable. This view of time is further reinforced in the next two steps: the planning of targets to realize the optimal values and the scheduling of the activities or tasks to hit the planned targets—the targets that can be broken down into minute levels (e.g. hourly

[16] There are many other variables like space, for example, that is expressed and optimized in terms of the distance that a material is moved on the shop floor.

targets). Next, I turn to integration.

Integration is realized by linking each function and with its sub functions. These links are translated as relations between the function/sub functions (which are basically data), and constructed into a relational database. The relational integration of functions also implies a view of efficient coordination of action over space and time, an instrumental rational assumption, especially since these discrete data sets will be the responsibility of different groups of people (like the Purchasing department, and the Sales department). More importantly, through relational linking, the data and the operations on the data can become dependent on other data and the operations on them. For example, since the Sales functional module (set of data) is linked with the Production functional module (set of data)) through product ID—one linking key[17]--it may happen sales invoices cannot be generated unless the Production department enters or record the status of completion of the product. In practice, the implication is that the time at which production completion data should be recorded is dependent on, and bound by the starting time of the sales invoice generation. Actions (e.g. data recording) get time-bound which, in turn, makes time a bound entity. Thus, it is assumed that time is finite and measurable.

The standardization, optimization, and integration are made possible through breaking down the tasks. That is ERP technology, as perhaps any technology, reconstitutes organizational operations only after it has broken them down into the minutest detail. The meticulous definition of data items, the precise identification of transactional steps, and the fashioning of such steps into clearly described sequences that cover the

[17] For example, the product ID will be present in the master tables of both Sales module and Production module

operations of the entire organization are essential to ERP packages. The unspoken or hidden premise onto which ERP systems are predicated assumes that organizational operations can ultimately be reduced to a large series of procedural steps. On this account, organizing is no more than the mechanics by which these steps are brought together and coordinated. The syntax of ERP systems just entails carefully defined data items, transactional steps and rules for bringing them into various combinations. Placed in such a context, the meaning of process tends, in fact, to dissolve into that of procedure, i.e. a linear sequence of discrete transactional steps necessary to accomplish a certain task (Sawyer & Southwick, 2002). The mandatory adherence to procedures that is to be enacted by the ERP user imposes a linear temporal order on the task execution (as opposed to the lack of this linear temporal order in the sequence skipping of WestIndia).

In sum, in the enactment of ERP's global practices, time is expected to be objective, rigid, linear, bound, measurable and controllable. The expected enactments of these temporal norms are schedule adherence and procedural adherence, and time bound action. If we compare these temporal norms and enactments, they are in conflict with that of the temporal norms and enactment in WestIndia. ERP's temporal norms reflect, to a significant extent, the set of temporal norms that has been labeled "Western" in the literature. Following the literature on temporal norms, if we assume that these are the temporal norms more frequently enacted or made salient in Western, or perhaps more industrialized part of the world, it is not surprising that ERP's temporal norms is the reflection of those so-called Western norms. This is because ERP has been designed and developed originally in the Western countries. As I mentioned earlier, the literature on technology development has suggested that developer's norms or broadly culture gets inscribed into technology (Dubinskas, 1988). In short, there is a

conflict between the temporal norms and enactments of WestIndia's local practices and the temporal norms and expected enactment of ERP's global practices. Also, while WestIndia's temporal norms reflect the so-called traditional norms, ERP's temporal norms reflect the so-called Western norms. Thus, we have a cross-temporal cross-cultural context in which ERP was implemented. Since the same arguments go with GovIndia too, I do not discuss the GovIndia case in detail.

Having defined and explicated the key terms in my study and their empirical significance, in the following paragraph I give more empirical context, a brief sketch of the industrial and institutional environment of the State where the two implementations took place.

4.3 The industrial and the institutional environments of the State

Among all Indian states,[18] the State had the highest rate of literacy, 90% (National Survey India, 2006), is one of the smallest states in terms of geographical area, covering only 1.10% of India's total land area, and ranked third highest in terms of population density, 819 persons per sq. km. (The State census report, 2001), nearly three times as densely populated as the rest of India, with a per-capita GSDP of USD 237.09 (Raman, 2005), above the Indian average and far below the world average (Mohindra, 2003:8). The State's Human Development Index (HDI) rating was the highest in India (Varma, 2005) and is comparable with the HDI of the advanced nations in Asia (Heller, 1999; Varma, 2005). The high population density, high number of educated youth (service sector is the main economy and education is the prominent one in service sector), and low number of industries in secondary sector have resulted in large pool of unemployed or under-employed manpower (Heller,

[18] India has fifty two states that have semi-federal nature in its functioning

1999; Varma, 2005), the unemployment rate being 15.1%, the highest in India (Zachariah & Rajan, 2006). Many of the unemployed youth are active in trade unionism and state politics wherein the State had the highest number of public protestations (The Hindu, July 5, 2005; Heller, 1999).

Some scholars have drawn a direct link between labor militancy that has been attributed to have caused low private investment and poor economic performance (Heller, 1999, e.g., Alexander, 1972; Herring, 1989;1991; Sankaranarayanan & Bhai, 1994; Thampy, 1990). With regard to the private investment, the state had only 3.5 % (below national average of 5%) growth during 1980-2000, and thus the major enterprises were still public organizations. But, during the period of 2000-2007, there was a significant change. The State showed 8.93% growth in number of industrial enterprises that is higher than the 4.8% of national growth rate (Economic census India, 2005). This growth has been claimed to be an effect of change in the attitude of the political parties. That is, following the earlier lead of right wing parties, in year 2000, the left wing parties changed their stand towards both private investments and the implementation of modern technologies in the workplace. The media as well as the left-wing scholarship discussed this change widely (The Hindu on modernization in the State, 2003). During the current decade, these changes manifested in 'corporate friendly' labor market policies that 'would loosen the labor market rigidity', consistent efforts by the alternate right wing and left wing governments to attract and sustain private investments especially by multinational corporations, and modernization of Public Sector Organizations (PSOs) (Bhattacharjea, 2006). This changed environment is the context in which the ERP implementations take place in the two organizations under study.

In the next two chapters, I describe and analyze the two ERP implementations that I studied. I use technology frame—the central category that I developed in this chapter as the interpretive frame (Bartunek & Moth, 1987) of my analysis. Through the two analyses, I connect the central category, the technology frame with other categories that I develop during my analysis. The relationship between the categories will lead us to a theoretical model that answers my research question.

CHAPTER 5

RESISTANCE BY OTHER MEANS: ERP IMPLEMENTATION IN GOVINDIA

This chapter presents the analysis of the implementation of ERP in GovIndia using technology frame as the interpretive framework (Bartunek & Moth, 1987). I present the episodes of implementation as changes in technology frames that occur through negotiation over the changes. I present the episodes in an approximate chronological order. I used the changes in two or more aspects of the technology frame as the criterion to slice the whole spectrum of events into different stages. Thus, the label stage does not necessarily indicate a temporal aspect. Instead, it signifies a change in technological frame. Still, the stages as it evolved in the two organizations mostly follow a chronological sequential order with some overlaps between consecutive stages. Wherever there was a significant overlap between consecutive stages, I mention it at that point of discussion. To understand the second ERP implementation that I examine in the following chapter I employ the same interpretive lens and style. To put the ERP implementation in context, below, I describe the historical context in which GovIndian ERP implementation occurred.

5.1 The historical context of the implementation

GovIndia is a State owned public sector premier manufacturer of basic chemicals such as chlorine, caustic soda, and lime. Before the year 2000, 80% of the production was sold out through annual contracts with other PSOs (Company document, 2000). During the current decade (2000-2010), GovIndia lost 10% of its annual contracts with a few PSOs because these organizations switched to other private companies (Company document, 2008). Therefore, there is a change in the market competition, which the management assessed as moderate (Company document, 2008).

During the past decades (1980-1990 & 1990-2000) many PSOs had faced frequent employee strikes, many times over technological change (The Hindu, July5, 2005). As mentioned earlier, the TUs affiliated with left wing parties called "left wing TUs" strongly opposed the introduction of information technology, arguing that it would result in the replacement of labor skill by technology. This reflects the Bravermanian deskilling thesis in the technology implementation literature (Lewis, 1997; Panteli & Corbett, 1996). For example, in GovIndia when the ruling government (right-wing government at that time) initiated automation of chemical plants, there were series of employee strikes staged by the left-wing TUs. The main attributed cause (by media and scholarship) for the slow-growth or death of many was the frequent strikes. During 1985-1995 many PSOs were declared "sick"[19] (BIFR annual report, 2000) and some were either closed or privatized. Policy makers suggested "modernization" as the medicine to revamp the PSOs that would soon become sick and categorized them as "stagnant PSOs". For example, in the year 1992, GovIndia was categorized as a "stagnant PSO" (but not "sick") in need of modernization (BIFR Annual report, 1993). Modernization meant not only automation but also application of "modern management techniques" (Company document, 1999) such as Total Quality Management (TQM). This was the situation from 1990 to 1995.

In 1996, when the left-wing coalition came to rule the state (following the 1991-1995 ruling of the right wing coalition), the party declared that it would reexamine its stand toward technology change in PSOs (Malayala Manorama daily, July 31, 1996).

[19]The Board for Industrial and Financial Restructuring (BIFR)—a central or federal government agency--under the Sick Industrial (Special Provision) Act 1985, has the authority to declare an industrial organization as "sick".

Gradually, by year 2000, the party pointed out the need for modern technologies to revitalize PSOs. The party also asked all TUs to support such initiatives since they were seen as the only means to increase the job opportunities in the State. As the media reports indicate and my interview data show, the change in the stand towards technology implementation trickled down to the TUs in the workplace. For example, in GovIndia, the TUs supported the TQM implementation that spanned 2000-2002, and the "computerization" initiatives that started in the year 2004 (I describe it later). ERP implementation is a part of this computerization initiative.

Suggesting that the power relations can be embedded in technology, some scholars of sociology of technology have noted that technology is politics by other means (Latour, 1981:229; Woolgar, 1996:92). At the heart of such politics lies resistance (Jermier, Kinghts, & Nord, 1994). In the case of GovIndia, the ERP implementation was unfolded through managerial employees' (except the top management's) resistance to GovIndian top management's action. Thus, as the title of this chapter indicates, the ERP technology became a means for expressing employee resistance against the top management. In other words, the ERP technology and the implementation came to be employee resistance by other means. To understand the employee resistance at GovIndian, and in turn, the ERP implementation more contextually, we need to look at the 'organizational climate' (James & Jones, 1974)—a climate of managerial employees' resistance.

5.2 A climate of resistance

During an interview, one administrative manager put the change in the current GovIndian climate succinctly:

"Our earlier culture was that if boss commands something, it will be done irrespective

of whether it is positive or negative. Present culture is nearly the opposite…We used to respect the management [earlier]. They used to reciprocate. That is gone now...We used to obey even the managers in other departments.. Today, even if my boss says to make a payment today, I would say okay; but will do it only after, say, two or three days. [The employees considered this response as an ongoing informal go-slow strike]. The general tendency now is to defy..if possible..mostly due to lack of motivation..that has surely affected the implementation badly."

The managerial employees including the top management attributed the reason for such resistance to unresolved grievances about low salary (roughly two times less compared to the salary that the multinationals offer, 1.2 times less compared to the salary that the Central Government (equivalent to Federal government in the U.S.) of India provides, keeping grade of employee constant), low career growth due to stagnant promotions[20], increase in workload due to freeze on recruitment[21] while retirement is frequent,[22] and consequent lack of motivation. A recent study on employee motivation in GovIndia found the level of employee motivation among managerial employees (except the top management) as worse (on a seven point Lickert scale) (Nair, 2006). The significant reasons for lack of motivation, according to that report, are the same as those mentioned above. To these reasons, during my interviews, many employees added two more reasons, lack of appreciation from superiors and unhealthy political intervention that resulted in current unfair promotions. Some managers attributed the reasons such as 'increase in workload' to the change in the GovIndian culture from a "command (by the superiors) and obey (by subordinates)" culture to a "request (by superiors) and resist (by subordinates)" culture. For example, see a senior manager's (a member of the top management) comment during an interview:

[20] One average a managerial employee had been in the same hierarchical status for past 12 years.
[21] In PSOs, the State government had imposed a freeze on new recruitment.
[22] The average age of GovIndian employees is 45 (HRD document, 2006). As per the State rule, an employee retires at the age of 55.

"I should also explain the situation to you. Many times in the plant, mangers are at the mercy of engineers. For example, it is compulsory that in a shift there should be two engineers. [Currently] These two engineers are handling four engineers' work. Now, when the next shift comes, the second engineer may be on leave on genuine ground. The manager then has to request, rather than command the engineer, to stay back for another shift. This has been a regular feature (once in a week). That resulted in managers loosing grip over their subordinates. The effect has gone up to the top management except the MD and perhaps the DGM, the only people who can force the subordinators or can take strict action against them at present."

The ERP implementation unfolds the recursive relationship between employee resistance and management's action in the changing or changed climate. In the following sections, using technology frame as the analytic lens, I present how this action-resistance (response) couple unfolded through various stages of the ERP implementation. But, before that, below, I describe briefly the evolution of the idea of ERP implementation since this evolution set up the backdrop for the technology frames that emerged later..

5.3 Evolution of the idea of integrated exhaustively automating software solution

Earlier, I mentioned that in GovIndia ERP implementation was a part of the "computerization" program that the State Government asked Public Sector Organizations to implement (State Government Order, January 10, 2005). Accordingly, many PSOs in this State had ongoing "ERP implementation" programs (Malayala Manorama daily, March 13, 2006). GovIndia was no exception. The government order did not mention or suggest "ERP implementation" per se. Instead, the order asked the PSOs to 'modernize' the organization by 'implementing modern Information Technology tools' that would help 'faster effective decision-making and management' (State Government Order, 2004). As the top management reported, GovIndia (like other PSOs) had a free hand to choose what to implement and how to implement it. The top management held a series of discussions in which the TU's were

not involved. It also discussed this point in the regular monthly meetings with the head of each department. Through such discussions the idea of implementing an "integrated software solution" (Company document, 2006) came up. In the spirit of "computerization" that was synonymously used for automation of work practices, GovIndian managers expected such an integrated software solution to be capable of exhaustively automating the work processes (Minutes of HOD meeting, January 6, 2006). For example, below is a representative excerpt from interviews with the employees:

Head of department 1: In the beginning our expectation was to get a very high level of automation of manual work. I don't mean exactly a paperless office but pretty much close to that, and then a good information flow across all departments to get all relevant information online..the idea was to achieve exhaustive automation that would lead to *reduction of our work*. Therefore, everyone was interested in this project.

Senior Accounts Officer: In the beginning, when we went for the first meeting with Itech (the ERP consultant who implemented the ERP) our idea about ERP was that everything we will get at our fingertips..our goal was to have a paperless office. This is what we heard.. this is what we expected. We had a nice picture of our work getting reduced.

Fifteen interviews reflected 'paperless office' (in vivo) or exhaustive automation as an expectation of ERP implementation referring to this period of time. Related expressions (e.g., complete automation) came up in twenty other interviews. As indicated in the above two excerpts, the expectation of the staff was that such automation would lead to reduction of their work content. This seems to be the primary reason for employees' initial interests. Next, I describe how this image of exhaustive automation was subsumed into another image, an integrated software.

GovIndia is divided broadly into two domains: a) office side, and b) plant side. The

office buildings are geographically located near the main entrance of the company (1/4 mile from the entrance and within one-mile radius), while the plant buildings are located farther from the main entrance (1.5 mile from the entrance and within six-mile radius). The plant side has its own separate entrance. The main functions of the office side are those that support the production such as general management, finance and accounting, sales, HR, administration, materials management, project management, and purchase. The main functions of the plant side are direct production such as manufacturing of the basic chemicals and maintenance of the plants and the office including the buildings and equipment. The office side had an existing independent Information Systems (IS) while the plant side had no IS. The initial idea was to integrate the existing independent MIS of the office side into a large integrated software. But since these MISs had been developed with old genre software languages for which expertise was not available in the market, the management dropped the idea of integrating existing IS. The next idea was to purchase an off-the-shelf software that could integrate and automate all office functions. Later, the functions of the plant side also were added into the project. Thus, the final idea was to go for an "integrated software solution" that could integrate all functions of GovIndia (Minutes of Board room meeting, 12, February, 2006). The minutes of the meeting did not mention the idea of automation. However, during the interviews most of the interviewees recalled that they had interpreted integrated software as a part of computerization (that is automation), and therefore expected it to result in automation of employees' manual tasks.

After the idea of an integrated software solution was finalized in the HODs meetings, the Managing Director (MD) constituted a "cell" (task force) to prepare with the details of tender advertisement and a draft of the work contract. The cell had eleven

members at the middle manager/officer level, each one representing different department. The cell members had expected that they would be given the overall responsibility to implement the software. By the time the final drafts of the tender advertisement and the work contract were ready, the chairman of the cell passed away. Subsequently, the MD dissolved the cell. The MD transferred the responsibilities of the software implementation to the Head of the Project division (HPD). HPD requested the MD to transfer the then-materials manager to assist HPD in the implementation. The MD created a new post, Manager Information System (MIS) and transferred the materials manager to Projects Division appointing him as M. Here onwards HPD and MIS had been the coordinators for the software implementation. I use the term 'ERP coordinators' to denote MIS and HPD, as GovIndian employees used it. Before MIS's post was created, GovIndia had invited competitive bids for the software implementation.

5.4 Stage 1: From integrated software to customizable integrated software-ERP an exhaustively automating completely customizable integrated software

Many companies responded to GovIndia's tender advertisement. As per the state government rule, the lowest bidder would win the contract unless the management decided to choose another bidder with sufficient justification for such decision. An external auditor would scrutinize these justifications during annual external auditing of the company. Therefore, to avoid problems during auditing, GovIndia used to choose the lowest bidder. GovIndia asked for sales presentation from the five lowest bidders. Three of them had reputed ERP software (such as SAP and Oracle) to offer, while the remaining two proposed to develop customized integrated software for GovIndia. One of these two bidders, Itech Inc. projected their software as ERP application. Itech inc. also mentioned the aspect of task automation. These two parties, in their sales

presentation, pointed to the failures of reputed ERP software due to their lack of customizability and flexibility. GovIndia feared that choosing less customizable or inflexible software such as SAP and Oracle would result in a difficult situation of either being forced to adopt the standard ERP practices built into these software products changing GovIndia's local practices, or having the implementation result in a failure (Minutes of HOD meeting, June 6, 2006). Therefore, 'in order to retain our (organization's local) procedures' and the underlying 'rigid government rules', GovIndia wanted to have a 'completely customizable integrated software' (Minutes of the HOD meeting, June 6, 2006). GovIndia held negotiations with Itech inc. and the other bidder. Itech inc. reduced its price quote below that of the other bidder and thus became the lowest bidder. Citing this reason, GovIndia chose Itech inc. for 'developing a significantly customizable integrated software solution for GovIndia' (Company document, 2006). Thus, there was an expansion of the image of the software, or the expectation about the software, from "integrated software" to "completely customizable integrated software". This sensemaking (Weick et al., 2005) about ERP before its implementation was prevalent among the employees. See some excerpts from interviews:

Quality Engineer: That time our expectation was like this: a customized integrated software solution exclusively for GovIndia. The software engineers would develop an integrated software from scratch that would automate our transactions. Actually, Ramesh (a cell member) told me that this was their [cell members'] idea when they drafted the contract…

Manager 2: We expected them to develop a fully customized integrated software for us..That was the major benefit we anticipated, of course, apart from the low cost…at the same time, as I mentioned earlier, we expected a complete automation that covers all GovIndia.

Safety engineer: Although we started with just an integrated software, I think the idea was not to go for an off-the-shelf software..in the beginning this was not very

clear..we knew that we needed an integrated software, one that completely automates GovIndia ..then we understood what we need is a maximally customizable software..this is what the management told them (the consultants).

As we can see from the excerpts of interviews, the GovIndian employees in general retained the expectation of exhaustive automation that underlay the image of customizable integrated software. During this period, 90% of the written communication between GovIndian management, represented by HPD and MIS (the ERP coordinators), and Itech's management carried subject line as "development of integrated software solution". In all these communications, Itech employees who would work on this project were labeled as "software engineers" (as opposed to software consultants or ERP consultants), which signaled that the software is not an off-the-shelf product but that some software engineers would develop it for GovIndia. The written communication within GovIndia such as internal memos regarding the software implementation, carried subject lines as either "development of integrated software solution" or "development of customizable integrated system" or "development of integrated computerization". There was no word "ERP" in these written communications. Interestingly, another written communication, the draft of the work contract, was modified (from what the cell had drafted). "Integrated software solution" and "Enterprise Resource Planning (ERP) solution" were used synonymously in the modified work contract. For example, see four representative sentences from the work contract: 1) 'The integrated ERP software will be substantiated after 3 months of successful trial run', 2) 'supply and substantiation of an integrated software solution spanning different departments', 3) 'source code of the ERP software is to be provided..', 4) 'the infrastructure requirements for implementing the integrated software solution'

The work contract shows that Itech had agreed to develop a '*fully customizable* Enterprise Resource Planning solution' (or "integrated software solution") for GovIndia. Some of the interviewees recalled that at this point in time, the employees as well as the consultants started using the word ERP and integrated software interchangeably in their daily talk. From this interchangeable use, some employees expected that the 'new software would have significantly customizable (although not completely customizable) best business practices or in-built industry standards'. This was based on these employees' understanding about ERP as a customizable standard software with best business practices or industry standards.

At this point in time, Itech suggested GovIndia to start preparing the system requirement and to send it to Itech in the format that Itech supplied (Itech's technical manager's letter to HPD dated June 24, 2006). The format had an Inputs-Process-Output format. To fill out this format, each department of GovIndia held a group discussion among managers, engineers (in the case of plants) and officers (in the case of office) within each department. Meanwhile, a team of four Itech software engineers came to GovIndia and spent three days collecting the input and asking for clarifications. Itech as well as GovIndia called this three-day effort, the system requirement study (SRS), and the resultant draft document, the SRS document. The average (as well as modal) time that Itech spent in each department for SRS was about 2 hours (maximum 5 hours, minimum 1 hour). This was against the expectation of many employees, especially the office staff who had more experience with IS implementation. GovIndia asked Itech to meet all the requirements as it was drafted in the SRS. Itech agreed that they would meet all SRS requirements. Itech also assured that they would develop a prototype software at their site (Bangalore, a city in another State) based on their previous experience and the ERP software that they implemented

in another public sector organization, SQC. Subsequently, they would straight away implement the new ERP application software in GovIndia for trial use (Itech business manager's letter dated June 30,2006).

From such written communications as well as oral discussions during SRS, the employees expected the resulting software to be significantly customized ERP software tailored to GovIndia's requirements. Quite contrary to their expectation, when Itech came with their ERP software after two months (in August 2006), the employees noticed that the built-in work practices were different from GovIndia's work practices. The employees suspected that the so-called standard practices were the practices of the previous company, SQC, where Itech had an "ERP" project running. Moreover, many of the modules that GovIndia had mentioned in the work contract were not included in the software. Instead, Itech identified these modules as 'additional modules..that can be provided under additional scope of supply at a later date' (Itech's letter dated August 25, 2006). The ERP coordinators (from GovIndia) wrote back: 'In the work order it is clearly mentioned under scope of work that you have to cover *all the departments* (italics in original) identified by GovIndia after completion of your system requirement study. You have accepted the work order and work was started. Hence, the above modules cannot be considered as additional scope of work..Moreover, as you have mentioned that your ERP is an *exhaustive* (my emphasis) system, it is expected that you would cover various [GovIndian] departments..Your consultants had promised us to show a prototype of the system that is *fully customized* (my emphasis). But, in the prototype SQC's [the public sector organization where Itech had an ongoing ERP project] forms and entries are seen that is to be corrected'. (HPD's letter to Itech dated August 26, 2006).

As the italicized terms indicate, these communications also reinforced the image of a completely customizable exhaustive ERP software. Itech mentioned that although they used SQC (the previous company where Itech claimed to have implemented an ERP) procedures that were customized standard procedures, Itech had customized these procedures further to suit GovIndia's needs. The Itech consultants went ahead with customizing the SQC practices to tailor to GovIndia's need. But, the GovIndian employees opposed such moves openly during the interaction with Itech employees. Meanwhile, the management asked GovIndian employees to cooperate with Itech so that Itech would customize their software to suit GovIndia's needs (HPD's note dated October 5, 2006 to all HODs endorsed by DGM). The employees seemed to be increasing their cooperation by regularly turning up to give inputs to the software engineers who were customizing the software.

Subsequently, the GovIndian staff in their staff meeting suggested that in accordance with the work contract Itech should develop an integrated software from scratch exclusively for GovIndia (Minutes of staff meeting, November 5, 2006). Finally, the GovIndian management asked Itech to develop a software from scratch (HPD's note, November 11, 2006). But Itech initially opposed this suggestion, mentioning that a) ERP meant that there had to be built-in practices and then they were customized, and b) it would delay the project and would in turn cause huge financial loss to Itech inc. as well as to GovIndia. Subsequently, as MIS explained in an interview, in a discussion with Itech's business manager, the HPD and MIS indicated the likelihood of terminating the contract if Itech failed to develop a fully customized ERP for GovIndia. Below is the relevant part from MIS's interview:

"When they [Itech] became too adamant [against significant customization], we had to change our voice a bit. We highlighted the contract clause for terminating their work

and the chance for such action. Then we could see a change in their stand. You know, sometimes these things only work".

Neither Itech nor GovIndia documented this conversation or any indication of the threat. None of the employees except the top management knew about threatening Itech. Itech fell in line and claimed to start a complete customization.

Note that for Itech, ERP meant the presence of built-in standard practices to which the organization should yield at least to some extent, while for GovIndia (except for some employees) ERP meant just integrated software irrespective of whether it had built-in standard practices. The GovIndian employees' synonymous use of integrated software and ERP in their daily conversation as well as in formal documents, such as work contract, is a manifestation of this view of ERP. In line with this meaning attributed to ERP, Itech was forced to develop a fully customized ERP. Itech felt that it had no choice but to accept this meaning of ERP (against their will), and in turn, change their technology frame of ERP as a customizable standard off-the-shelf product to a fully custom built integrated software. For example, see an excerpt from Itech's business manager's interview:

"Instead of us if they (GovIndia) had SAP [System Application Products], they (SAP) would have bade bye-bye (when GovIndia asked for total customization). They (SAP) should have escaped by this time. But in our case, we are a small company, if we do like this, nobody will give us a project…Whereas in SAP's case they can demand, in our case we have to budge even though we are forced to start from scratch…now, we are developing a new fully customized ERP for GovIndia."

But a little later in the interview, we can see the same manager interpreting and projecting this total customization as Itech's flexibility (that implies a volitional choice) and sensitivity towards GovIndia's needs.
"Initially we tried to reuse. We struggled to bring in everything (referring to the

standard practices). Now, we are trying to give as much as they want. This is just to keep our promise. Even the configuration we are changing. Our approach is: tell me whatever you want I'll give you the solution. This is a complete customized approach, a total flexibility from our side, as we promised them."

Intentionally or unintentionally, the fact of a coerced consent was turned into a story of understanding customer needs and solving their problems—Itech's attempt to satisfy the customer. Itech employees as well as GovIndia employees reproduced this story. For example, see a representative talk from GovIndian employee's interview:

"We told them straight that they have to customize completely to meet our procedures. We cannot change the government procedures. Now, they realized this fact. So they are trying to understand our procedures and solve our problems technically".

See a similar point in a conversation between a GovIndian employee and an Itech employee:

"See, he (Itech's business manager) asked us to keep it as flexible and open as possible because that is what he had promised. So we are trying to understand your procedures sir, and develop the software accordingly. That is why it is taking us more time."

The conversion of the coerced consent into a repeated story of Itech's customer responsiveness, if removed from its historical context, would suggest that the similarities in GovIndia's and Itech's technological frame (meaning of ERP as an integrated software) was a result of consensus and the shared sensemaking. *The information systems literature (e.g. Orlikowski & Gash, 1994; Davidson, 2002) as well as the organizational studies literature (e.g., Edmonson, Bohmer, & Pisano, 2001) that use technology frame suggests that the similarities of the cognitive content between actors' technology frame is a result of shared sensemaking. But the above-described part of my study suggests that such a conclusion may be questionable unless*

the possibility of coerced consent is addressed explicitly. The cognitive similarities may occur also as a result of coercion. This insight suggests that to generate a consensus on technology frame, and in turn, the meaning of technology, in addition to rhetoric and redefinition of problems (Pinch & Bijker, 1987), actors may also use coercive techniques. We will see these two points emerging again.

We have seen that ERP technology has acquired a new meaning in this process, that is, ERP as merely an integrated software with no mandatory built-in standard practices. Following this new meaning, at this point in time many interviewed GovIndian employees who had understood ERP as a standard software with built-in best business practices, interpreted integrated software with standard practices as "branded ERPs" and integrated software without standard practices as "non-branded ERP". Thus, GovIndian employees' common understanding was that Itech had been developing a non-branded customizable ERP for GovIndia. For example see an excerpt from an HOD's (H) interview:

Interviewer: Is there any difference between integrated software solution and ERP?
H: Now, people are talking about integrated software systems as ERP. Even they call it mini ERP in some companies. That is a kind of non-branded ERP. That is what we call it here.

See an often-repeated dialogue between the interviewer and the interviewee during this time:

Interviewer: What do you call this new technology?
Interviewee: Integrated software, in other words ERP..It's not a branded ERP such as SAP. But, it's a non-branded ERP.

An analysis of the written communication between Itech and GovIndia, and within

GovIndia showed that now the software was commonly referred to as customized ERP or a customized integrated software solution, the two terms being used interchangeably. Further, the synonymous use of the terms 'integrated software' and 'ERP' in the daily conversations between Itech employees and GovIndian employees, and among GovIndian employees, reproduced and reinforced the 'matter of fact'[23] (Latour, 1999:307) that ERP is just an integrated software. Moreover, whenever GovIndian employees tested the software, they had to pass through a first computer screen entitled 'ERP Application for GovIndia' (in a very visible and striking manner with illumination, bold font with size 150 point) which stayed in sight for about 30 seconds. Many users had noticed this title and were irritated by the length of the time this screen stayed in sight. Moreover, in all other screens that the user would see this title appeared in conspicuous but small size (22 point). These incidents reinforced the "fact" the new meaning of ERP. *Thus, so far, it is a mix of coercion (of Itech) and rhetoric (among GovIndian employees), that 'stabilized' (Pinch & Bijker, 1987) the meaning of ERP as an integrated software.*

By this time Itech had developed a few fully customized sub modules and given them for testing to the users, which took significantly more time than Itech had expected. Meanwhile, four of the Itech employees who were deployed in GovIndian ERP project resigned. Consequently, Itech deployed newly recruited employees in the GovIndian project. These employees, who were fresh graduates with Information Technology/Computer Engineering academic training, were left with the SQC model with which Itech started GovIndian project. Itech management had asked the new employees to a) retain the server design and the business logic they had in SQC ERP

[23] Matter of fact: something so ingratiated within a community as a result of extended negotiations that its presence is indisputable and obvious (Latour, 1999:307)

to the possible extent, b) change the database design to minimum extent, and c) change the only front end views (such as forms and the screens that the user see) to satisfy GovIndian needs . In other ways also, as the Itech engineers expressed in an interview, without practical experience they felt it enormously challenging to change the technology significantly (for example by changing the configuration or architecture or server designs including the business logics). Itech's MD had emailed the Itech engineers asking them to finish the project as quickly as possible since the estimated project time was one year while the project had already crossed 22 months by now. Hence, the new Itech employees found themselves in a tight situation since they simultaneously had to satisfy the GovIndian employees who pressured to automate their individual work to the possible extent and to encode the GovIndian procedures intact changing the technology significantly.

5.5 Stage 2: From complete customization to partial customization-ERP a partially customizable integrated software

Itech software engineers as well as their technical manager dealt with this tight situation by projecting the translation of GovIndian work practices into software codes as impossible due to "system limitation". At this point in time, the Itech engineers as well as the GovIndian user employees interpreted system limitation as the technical constraints that made it impossible to either automate or translate organizations existing work practices into software codes. For example, see an excerpt from the conversation between Itech's technical manager (TM) and a set of GovIndian employees:

TM: In your Flicker (the existing IS), you can straight away code into the database according to your needs. But this technology is Linux based web system (as opposed to Window based), more complex, and entirely different. In our technology, the code has to go from the screen to the EJB, from EJB to hypernet, and then to strut. I have

to automate all these links and then only I can connect to the application server. Through application server, I have to send it to the database server. That is what I need. This is neither client server nor window-based with which you guys are familiar. In client server, you can do any program, you can bring in any procedure, any flexibility you can make, and you can automate anything. In our system, nothing is possible that way. To do that, we have to completely change the technology.

The same point came up in my interview with Itech's business manager:

"You go select table, everything comes here, this is their (GovIndian employees) understanding. They think that this system is like their existing systems. This system is totally different. It has its own limitation that we can do nothing. That is what we have been educating them. They are getting it bit by bit."

This 'education of the users' continued during the interaction between Itech engineers and GovIndian employees. During this stage I observed fifteen such instances of 'educating'. Below is a representative example.

This is from the discussion regarding modifying the ERP in order to meet GovIndia's existing purchase procedure. According to the existing procedure, the indenter would take the purchase folder that contained indent for the item to be purchased, the detailed description of the items, and the approval note of each superior in the chain (it can go up to the MD) through 22 steps of approval, to hand it over to the purchase manager. Once the suppliers quote their price, for the technical comparison of the products and the clarifications about technical specifications, the file will go from the purchase manager back to the indenter. Thus, there is a reverse flow. The Itech engineers were not ready to code this reverse flow. Instead, they suggested that the Purchase department print out the hard copy of all documents (since there is no internet or intranet available in GovIndia) and send it manually to the indenter. It was not possible for the indenter to take print out at his or her end since the software engineers

did not want to give access rights to the indenter. Giving access rights to indenter would have complicated the access right structure of the software. Now, see a part of the discussion between MIS, Assistant Managers (AM), and Itech Engineers (AE):

AM1: But, why is the reverse flow not possible?
AE1:Sir, the software will not allow us to do that.
MIS: Can you please explain?
AE2: Sir, you know, this is a java based multi tier program. Once you commit the event of ordering (Purchase Order) into the database, you cannot change it. If you really want to change, you will have to change the database design and then you will have to change the connection to EJB and the logic in the EJB. It amounts to almost adopting a new technology. We can do these things easily in Windows but not in this software.
AM2: But, then why can't you at least give the access right to indenters? Isn't it possible sir (to MIS)?
MIS: Rani, that will lead to so many other problems. These boys are right. In web based program we have a lot of limitations. So we have to understand such technical limitations and accept them as such, I think.

Finally, the technology was kept intact, not coding in the reverse flow. The implication was that the manual content of the work--an office assistant carrying purchase folder to the indenter and taking a print out that was not necessary--remained unchanged. This was against the expectation of employees that ERP would lead to significant automation, and in turn, reduction of their manual work content. See another example from a discussion between a senior engineer (SE) and Itech engineer (IE1) during testing of mechanical utility. The user asked for a search utility for finding cylinder number.

SE: "It should be a simple program. Even in excel we can do it"
IE1: 'Sir, this is a database based program. You can't change so easily as you do with excel. It has its own limitations. Also, you have to decide beforehand. There is a procedure that you made. If you want, you can modify. But you have to finalize and give us the final one. Then we can try, but I cannot assure you that it is possible. System may not allow it".

The discourse around the system limitation and technical constraints embodies a clear message that the technology has its own objective existence independent of the developers and users of the technology, and such complex existence limits the extent of customization and automation. In other words, Itech employees had been trying to give a new sense of technology to GovIndian employees using a technology frame that depicted the ERP as a complex software independently (of its developers and users) existing that limits the extent of customization. Thus, the Itech engineers employed this technology frame to 'mobilize sensegiving discourses' (Spicer, 2005) that would influence other actors' interpretation of technology and associated change.

Since such discourses had an intentional purposive goal (influence others' interpretation), it is strategic in nature (Child, 1972). Such sensegiving discourses are not simply a reproduction of the actors' sensemaking. For example, as Itech's software engineers expressed in an interview, they knew that if they had put more efforts into modifying the technology, it would have been possible to avoid the manual content of the purchase order processing job and encode the reverse flow. But perhaps for the sake of convenience, the software engineers chose to attribute the cause of difficulty to the nature of the software as opposed to so many other plausible reasons, such as lack of the engineers' knowledge and skill, and time pressure from the MD. At least with some engineers it was not a convenient expression of their sensemaking, but an intentional political choice. For example, see an excerpt from my interview (I) with an Itech Engineer (AE) regarding the reverse flow issue.

I: Yes, I see your point of the issue of difficulty in reversing the DB commitment. I also understand your difficulty to deal with the event triggers in this case. But, as per your tier structure, the data have to flow from EJB through the strut interface to the DB server, right?
AE: Yes
I: Then, why can't you stop the commitment to DB at the strut validation? It may be

possible if you create an interface logic in the strut layer that would sit between the EJB server and the strut layer, I guess. Also, writing exceptions to event handler might help.
AE: (a long pause) Sir, I don't really mean that it is impossible. What you suggest seems possible. But, unless I try it out, am not sure. The issue is actually none of these. Promise not to tell anyone, sir. See there are many things. We are fresh and our experience is limited. The seniors (the experienced Itech engineers who resigned) have not left any documentation and so we don't know much about how they built the architecture or they designed the database. Those guys do not respond to our queries now. Also, we are not given enough time to explore creative solutions, rather are time pressured. Then what can you do? You have to present it such that it hurts no one….Then, we sometimes highlight the technical constraints and system limitations to the users. This is what KK (Itech's technical manager) also did, you see.

Therefore, the use of technology frame as a discursive device for mobilizing sensegiving discourses could be both strategic and political. If it is strategic (or purposive), what is the purpose such sensegiving discourses serve? It is obvious from the data I presented that the logic such discourses embodied was 'system limitation' or 'technical constraints'. Therefore, such discourse was an attempt to create a perception among the users about *what technology cannot do*.

The human-computer interaction literature discusses the notion of "perceived affordance" (Norman, 1988; 1999) as a user perception of the capability and usability of material objects. "Perceived affordance" is built upon the concept of "affordance" (Gibson, 1979) that originated in social psychology. Norman (1988:9) defines perceived affordance as perceived properties and capabilities of the material object. Recently, Hutchby (2001) extended the notion of affordance to technology development and coined the term "technology affordance". Some scholars have used the term "perceived technology affordance" to denote how users perceive the usability or capabilities of technology (e.g., Gaver, 1991) including ERP software (e.g., Nandhakumar, Rossi, & Talvinen, 2005). Since perceived technology affordance is users' perception of what technology affords (or capable of) (Gaver, 1991), it is

possible to define "*perceived technology non-affordance"* as users' perception of what technology cannot afford or what technology is not capable of. Therefore, we can translate the purpose of the sensegiving discourses of Itech employees as trying to influence the perceived technology non-affordance of the users, GovIndian employees. *That means the system professionals' (e.g., Itech's software engineers and technical manager) expert power operates through mobilizing sensegiving discourses that attempts to create certain perceptions of technology non-affordance in users.* We will see this mode of exercise of system professionals' power again during another stage well as in the following case study of WestIndia's ERP implementation. I discuss the significance and implications of this new concept "perceived technology non-affordance" later in the discussion part.

5.6 Stage 3: From exhaustive automation to partial automation -ERP a partially automating integrated software

Meanwhile, through the interaction with the Itech software engineers (that involved creation of perceived technology non-affordance), and through testing and trial using the modules that Itech engineers had developed by this time, the employees realized that exhaustive automation, as claimed (by Itech) and agreed (between Itech and GovIndia) in the beginning was not coming through. Instead, GovIndian employees interpreted (a sensemaking process) ERP as a partially automating tool. In this new technology frame, there is a change in two aspects of the technology frame that we saw in stage 2: a) the degree of automation—from complete automation to partial automation, b) the customary presence of standard practices: this was not there in the technology frame of stage 2 but later added during stage 3 and then subsequently dropped. Note that the negotiations between the employees, the management, and the consultants occurred around these two changes. Corresponding to these changes, there

were changes in the other aspects of the technological frame such as anticipated or felt organizational changes (due to ERP implementation), and the expectations of ERP implementation.

By this time, Itech resumed the development of modules, such as the billing module, accounts module, and finance module, for the office side. Through the grapevine the image of partial automation had reached the office side. Many officers (office staff in supervisory capacity) informally discussed their concern about the reduction in the degree of automation with the MIS. For example, below is a part of the discussion between the Tax officer (TO), Accounts officer (AO) and MIS.

TO: Don (nick name for MIS), finally you are putting us in trouble. The boys (Itech engineers) are okay but not their software. I don't mean they don't have the capability. But, what you told us in the beginning that kind of automation is not coming through.
AO: Don, you know what happened in the plant. They are also not very satisfied. We expected a system better than our Flicker [existing IS] at least, leave Tally [another existing IS] alone."
MIS: I know that QC, UDAI, ME, and SE (different departments in the plant side) are fine with their ERP modules. Some of them started trial use. But, yah, we cannot get a paperless office, that was just a dream.
AO: We don't mean a complete automation. Don, all of us knew that it was just a dream. But, there should be a good level of automation. Otherwise, what is the use of it? If we integrate properly, we should also get a good level of automation. What is the problem Don?
MIS: See this is a Linux based web program. They are using novel multi tier architecture. So there are a lot of technical limitations. That is what I understood from KK (Itech's technical manager) and the boys. I think it is true to some extent. You both know well, the issues in developing a software. It is anyway impossible to automate many tasks using software.
TO: Don, we are not looking for that kind of automation. I think the real problem is that the boys have no documentation; they cannot trace what they did since they don't have any DFD (Data Flow Diagram) nor they know how to use professional tools. It is not their mistake, but they don't have the experience. Anyway, this much only we can expect from them with the payment we made, right Don?

As we can see from this representative discussion, in such discussions although MIS

was skeptical about the system limitation argument, he repeated the issue of impossibility to automate all operations due to inherent inability of software language. But, the employees who had IS background then redefined the complete automation as an expected level of automation. They also pointed to the lack of application of software engineering tools (expressed as "professional tool") such as DFDs as the reason for not achieving the expected level of automation (as opposed to the inherent nature of the ERP software). In the interviews that I held with these employees at this point in time and in the conversations these employees had with other GovIndian employees, some of these office staff members resumed questioning Itech's claim (and in turn management's support of such claims) of the software being developed as ERP technology. This questioning spilled over to the plant side too. Still, this questioning of the meaning of ERP did not gain predominance.

Along with this questioning, in the informal conversations among employees, the earlier discourse of anticipated failure of Itech came back to the front stage with more frequency. For example, see an informal discussion in one department between the HOD and a senior engineer (SE).

SE: Sunny, I hear many people saying that this won't work here. It's doubtful whether it'll be successful, right?
HOD: My Gopala, that is for sure. It cannot take even our existing small functions into it. The boys are too fresh to do this job. Neither Itech has any professional approach. It's just a third rate party got in through politics.
SE: My doubt is this. Isn't it ERP for taking an optimum decision considering the importance of Finance, Production, Sales, etc? Will that be done? Never.
HOD: Why've you gone to such an extent? It cannot even collect data properly. Then what? It's like operation is successful but the patient died. (Turning to the researcher), George, you got a fantastic patient here.
SE: Don't show such things to the US guys, okay? Don't quote us anywhere, okay?
HOD: Actually, we started eagerly looking for the growth of its hands and legs. Now, the only place left is to write its obituary. Many departments, which started with full enthusiasm, backed out by now. The so-called ERP is gonna be a failure, 100% sure. Georgekutty (researcher's pet name), you ask around, most of us will say the same.

Such conversation went a step further and in the interviews some GovIndian employees responded like this: “The main reasons for the failure of ERP implementation here are the lack of the boys’ (Itech engineers) business expertise, and their inability to understand..”. Thus, these people tried to move the discourse of anticipated failure into a ‘matter of fact’ (Latour, 1999:307). Note the reflection of the anticipated failure discourse in terms of not only highlighting the possible/actual failure of Itech but also finding fault with Itech. This was a repeated pattern in many interviews that I had during this time.

Finding-fault-with-Itech included complaining publicly and privately about Itech employees’ poor communication (in English) ability, low comprehensibility, poor documentation, lack of business knowledge (or “domain expertise”), employee turn over, and lack of knowledge about software engineering tools. For example, below is an excerpt from a tax officer’s interview.

“ Then after we suggested it, when they did the modification the invoice became a replica of sales order. They froze even the tax components in the invoice! Also we can't amend the sales order. Even a layman would know this. Even in these simple matters we had to teach them means you can guess their domain knowledge.”

Part of a discussion between Sales officer (SO) and Sales clerk (SC):

SO: But, we need to enter the price only for the customers who don’t have sales order.
SC: That would have been great. The problem is that they know nothing about our pricing policy or our procedures or our sales. Just now only they went to MIS to ask about these things. They didn’t know that the price (of the lime) varies with the variation in concentration.
SO: I told them this point so many times. They just don’t get it. Curse me!
SC: Also, their communication is very unclear. Why do we have them here at all..
…….
SO (to the interviewer): See, these are the issues. They still don’t know how we arrive

at the price. I explained all these procedures a year back to them.

During a discussion between a manager (MM) and store clerk (SC) in Store:

MM: This party came in through the backdoor (alluring to political influence)..it shows up in the quality of their work. Don't you think so?
SC: I heard that story sir. I think the issue is that they don't have the expertise.

Interestingly, the management did not respond to the employee discourses and arguments. The employees interpreted this management act as a conscious discount of their voice. For example, see an excerpt from a finance officer's (FO) interview:

" (talking about office staff's resistance) No doubt, very significantly. Because after we co-operated so much in the beginning irrespective of all bad things like lack of appreciation and the problems with the consultants if the management responds like this (referring to the discounting and forcing), what can we do but to resist. Their (the management) agenda is to bring the system into life within a short time. This is true with Itech too. We too share that desire but not by compromising our requirements. This is what we want to say. They should at least listen. Instead, they are just forcing us…. Somebody concerned [referring to the MD] should open his eyes and ears to the reality and the sincere voices. Otherwise, he himself should take the initiative to understand. If neither of these happens, we can do nothing. You know we can wake up the one who is really sleeping but not the one who is pretending to sleep."

This feeling of not being heard or discounted, an aspect of the second dimension of power in Lukes' (1974) language or the exclusion of a different conception of technology in Laclau and Mauffe's (1985) language, was mostly confined to the office staff. However, the plant staff recognized and supported the office staff's resistance against this exclusion. For example, see an excerpt from the interview of an HOD:

"From the plant side, we wanted them [office staff with IS experience] to be involved because they are the people who know the software. But, now they are sidelined. We want them to be heard. Many of us here understand their issues and their oppositions…We share their concerns and support them"

In addition to supporting the resistance of office staff, a few staff members from the plant questioned the management's choice of Itech that was based on low cost. They argued that the management did not (and do not) consider the expense that GovIndia incurs by having Itech employees as company guests using company's facilities including free food, accommodation and other privileges. GovIndian employees also reduced their support to Itech's software development activities. For example, there was a significant reduction in the frequency of employee attendance in the system room where the employees came for testing the modules that Itech developed so far. Noting this, as HPD instructed, MIS sent repeated memos to the office staff (involved in ERP implementation) in the departments of Administration, Finance, and Accounts. MIS marked a copy of these memos to the top management except the MD. This became an issue in the next meeting of heads (HODs and divisional heads) in which HPD attributed the reason for slow progress in the development of the office modules to the lack of office staff's efforts. The office staff responded that since their workload had been increased (due to headcount reduction and year end work) they could not spend much time in the system room[24]. HPD then pointed out the drop in office staff's enthusiasm from the initial level (during stage 1 and stage 2). The office staff retorted that they had spent good amount of their time in teaching the basics of Accounts and Finance to Itech engineers which was not expected. They pointed out that their modules were not progressing since Itech did not have the requisite experts present here. The MD instructed HPD to ask Itech to bring their Finance experts as soon as possible. During my interviews with these staff members, they initially projected the

[24] GovIndian employees called the room, where the ERP related hardware and software were kept, either system room or ERP room. The employees could not access ERP software from their sitting place (workplace) since ERP system was not yet networked with the employees' computers that they used daily. Therefore, to test and trail use the ERP software, the employees had to come to the system room. Coming to the ERP room took 5 minutes for office staff and 15 minutes for plant staff.

same reasons for not going to the system room. But, later they told that their act was a protest against the management. Here is a representative example from the interview with an accounts officer who in the interview referred to the previously mentioned meeting:

"The workload reason to some extent is a pretext. Non-cooperation is the main reason. The management knows it well. That is why they are pressuring us by sending notes and memos. If we don't cooperate with the party whom they (the management) brought, it is certainly negative, it's a protest. Knowing that there is such a negative side only they called us for the meeting. Then our approach was like this: yes, it is negative; but it can be turned into positive: either you give this to a professional party or this party should work hard and produce the result that we desire. They should meet our expectations. If the system comes, it is beneficial to us also. If the system works well, our workload will come down. We will need to do only 30% or 20% of what we do right now. That means, to get a good ERP is our objective, theirs too. In the company at an overall level there will be reduction in workload."

Note the employee expectation of work reduction through automation. Here is another example from the interview with a Finance Officer (FO):

FO: See, the department, which sends the notes and memos, wants us to be in the system room daily for 2 hours and do the data entry. That is impossible. With heavy workload we are managing our work wonderfully. Normally, in such contexts, to boost employee morale the management will do something. Here, it is the opposite. The junior officer was given undue promotion. Leave it there. Apart from these, we have such heavy workload that we don't have time to go there. Then they started forcing us. We decided not to go.
I: What do you mean by force?
FO: The HPD sent note to FC [the super boss of the office staff] complaining against us and reported our names personally to the MD as non co-operating gangs. When we are forced we have to go. But then we will think how not to go for the next four turns and even if we go, not to give valuable inputs. This is what is happening, but that should not be the way. If I feel sincerely that it is my issue also, I can easily manage all my daily activities in addition to the ERP work.

As the accounts officer mentioned in the interview, the management was fully aware of this employee resistance. For example, see an excerpt from the MIS's interview:

"But the most important reason (for the lack of involvement in ERP project), this you should not report, there is a general dissatisfaction and all the employees are demoralized. They take this project as an opportunity to give vent to their dissatisfaction. If they don't do their routine work, they will be questioned; but if they don't come for data entry, their heads won't be cut off. Every one here knows that all other reasons are not very significant….Since the top (management) cannot easily take steps to increase employee motivation, they accept the reasons like heavy workload. These are known secrets."

Meanwhile, the consultants started projecting more system limitation issues. For example, below is an excerpt from the interview with an engineer (IE):

IE: Take the example of card swiping data for system limitation. We did the installation of Keltron Swiper. It gives us a data file, which is downloaded to the existing, IS and we use it. They (consultants) told that their system is not inter-operable with the swipe system. Even they told that they can't download the dat file into the oracle DB. I did it in simple VB. That is the way we do it now. So it should be possible in Oracle. They say it is a system limitation.
I: What are the difficulties they mentioned?
IE: Since it is not clear, HPD says that the existing clock (in the swiping machine) has no capability to generate the file required by ERP. That is not right (laughs). The issue is not clock. HPD doesn't know that. The boys say it'll work only if we use biometrics. They don't know about it. Biometrics is nothing but a reader unit. It also generates the output file in dat format. That is the way they project. Actually, I had thought of installing biometrics. These kinds of things they project in meetings. Then the people who don't know about it, most of the people here, will believe that the issue is either with the clock or ERP. I guess there is some issue of knowledge gap here.

Now, they increasingly added one more reason for system limitation that is the integration of various software modules that had already occurred. They argued that since ERP software is complex, and that through integration the data from different departments had been made dependent on each other, it would be difficult to incorporate the modifications suggestions in order to bring the coded practices closer

to the GovIndia's work practices. Below are some examples to illustrate this point:

During an interview, a plant engineer pointed out:
"Now, when we make suggestions, they say that they have to make changes in so many places since they are all linked. Therefore, many of us dropped further attempts to make suggestions"

Here is another excerpt from an Assistant Manager's (AM) interview:

AM: Now, take the issue of splitting of orders. In ERP you cannot split orders as they are linked to the MPR sub-module. That is the drawback of the system. That is what they said. As the integration progresses system gains a lot of constraints that you can do nothing about.
I: Where did you hear this; who mentioned it?
AM: The boys told us. It [the boys' explanation] looks reasonable. But, perhaps, it may be due to their lack of experience, as some people say. But, to avoid all fusses I just pretend that I believe the boys.

Below, is another illustration from one functional manager's (MM) interview:

MM: Yes, I told Don (MIS) so many times that it is not satisfactory. Then, he says all the time that it is an integrated system and so it has a lot of limitations and we have to bear with such limitations. This is what the boys also say.
I: Do you believe that?
MM: I don't have the technical expertise to evaluate. So I don't get into it. I don't have much time to spend on it, and raise my voice. My aim is just to get along, live peacefully without making much fuss, and not making any mistake and caught. So I pretend that I believe and make myself to behave so.

The above excerpts show that at least in some employees' case, the acceptance and reproduction of the consultant's "system limitation" discourse was partly driven by perceived threat. These employees' expressed conviction of the system limitation was partial.

The skepticism about the system limitations argument that appeared in the previous interview excerpts was partly produced by a counter discourse. The GovIndian employees with IT background (mostly in office side) spearheaded the counter discourse. These employees argued, even when the software is complex and that a significant amount of integration already occurred, still using software engineering tools software engineers should be able to trace easily the spots where the changes would have impact. They also argued that a software engineer with experience would be able to gauge the amount of that impact quickly. Therefore, the issue in their opinion was neither the inherent limitation of technology nor the path dependence of accumulated integration but the lack of experience of Itech's software engineers and their lack of expertise. They added that to hide such limitations, these software engineers had been using "system limitation" as a pre-text. Thus, these employees interpreted the software engineers' discursive attempt to shape technology non-affordance as a political strategy. Note that these employees were directly involved in the development of the existing IS and that these arguments were based on their experience. Thus, their discursive resistance to the Itech engineers' sensegiving discourse was an articulation of their practical experience (Haugaard, 1997; 2006). The counter discourse that the actors—some of the office staff members—formed had some effect. It did at least raise suspicion about the veracity of the Itech engineers' system limitation argument, and in turn, reduced the strength of the discourse of system limitation. Still, many employees from the plant side and office side agreed that regarding the constraints of technology and its technical nature they had to believe the software engineers to a great extent since no employees in GovIndia had the technical expertise in the software language or the operating system that this ERP used. Thus, the discourses of system limitation had some effect on some of the employees. In sum, we saw the mobilization of the hegemonic sensegiving discourses

using technology frame and the responses to such hegemony, which varies, from resistance and accommodation to cognitive changes (e.g. change in the aspects of meanings attributed to the ERP software).

In addition to projecting the system limitation based on the progressive integration, Itech engineers also asked the GovIndian employees to finalize their modification suggestions in one shot or with one testing and then not to ask for any significant changes after the testing. Some employees questioned the meaning of testing in that case. They argued that the employees could suggest changes only after repeated testing since they would learn the potential of software only through its use. This learning about the potential of technology is related to technology affordance (Nandhakumar et al., 2005) that I mentioned earlier. The consultants responded that such learning of technology's potential might be imaginary since users actually could not know about the complexity of the software and had only a partial view of the software. The message was that even if the users think that the ERP affords execution of certain tasks in certain ways, due to integration or the limitations of the database or the architecture (a special architecture), it might not be feasible practically. The consultants told the employees that this was what had been happening and that it had unnecessarily delayed the project. The argument here is that for the perceived technology affordance to be of any pragmatic value, it has to be based on the knowledge of technology non-affordance. Therefore, technology non-affordance is more important. The knowledge of technology non-affordance rests with the ERP consultants (Itech engineers). Therefore the employees should believe the ERP consultants. *This discursive attempt reinforces my earlier argument that the attempt to shape technology non-affordance is an exercise of 'expert power'* (French & Raven, 1958).

5.7 Stage 4: From automation to integration-ERP as an information integrator and an MIS report generator

Perhaps due to the mounting resistance from office side or the non-availability of Itech experts, the ERP coordinators decided to change the implementation strategy. By now, Itech had been developing both plant side and office side modules simultaneously. Now, as the coordinators suggested, Itech started focusing only on the plant side. Also, the ERP coordinators convinced the MD that unless he took direct action, the project would not pick up, which had already been delayed by two years. Now onwards the MD started spending more time on the issue of the software implementation in the meetings and giving direct command to the HODs and their subordinates. This was unusual in GovIndia culture since the MD rarely gave direction directly to employees hierarchically lower than HODs.

Within a week the MD called the next meeting (of HODs and departmental ERP facilitators) to discuss the ERP issues. In this meeting, the ERP coordinators projected the progress showing that on the plant side there was "good progress" while on the office side there was not much progress. The HODs from office side had no answer for the slow progress. In the meeting the MD asked whether the software would be able to offer the main functionalities in the existing systems and practices. The HODs said okay. The MD, then directed that all employees, especially office staff, should put all efforts to get the ERP working as soon as possible irrespective of the level of automation it could achieve. He said that the consultants has assured him of meeting the main objective of the software, that is integration and generation of integrated MIS reports.

Thus, in this meeting the top management's technology frame came out clearly: ERP as an information integrator that would generate MIS reports. In this frame, integration was more salient (Davidson, 2002) than automation.

The MD also suggested keeping an attendance register (book) in the system room to record who showed up on what date for testing. For employees the attendance register symbolized a direct surveillance tool. For example, here is an excerpt from a functional manager's (MM) interview:

MM: In front of MD, we all told that there are only some problems that we can resolve. But when he left, behind the door, we all cursed this ERP project…for not meeting our expectation..some sort of significant work reduction..but the management's interest is to finish it..somehow..get an information integrator..
I: And then what happened?
MM: Frankly, the main issue is lack of interest..you'll show it by not doing your work. But, when forced you've to do. They kept an attendance register (book to record) to monitor who is coming or not coming. They'll then take it to the M.D. I rushed soon to say that I am present and doing my work. It is simply due to fear. Still, I am doing my work…just trying to finish my part..

See another excerpt from my group discussion with the members of clerical staff:

S1: Now if we don't go when you are called, it is recorded. There is a register. I saw him recording yesterday.
S2: If we don't go when we are called, they think we are indifferent and non-cooperative. So there is a recording device now.
….
I: Sister, how do you feel about the attendance register?
S3: I saw many people now rushing to the ERP room. Since the MD is involved, we got to be really careful. It is to monitor us. There was a strong complaint lodged in the last meeting about the lack of co-operation…Then this one came to tackle that non-cooperation. Here you see if somebody takes a leave, we'll have additional work. That is what we mean by workload. But, another reason is we are a bit disappointed. We express it with our non-cooperation.
S2: Just true.

In the above excerpt, notice the feeling of fear and a resultant tendency to accept the top management's idea of getting an information integrator as opposed to a significantly automating tool. This feeling of being forced to accept the management's idea was widespread in the plant side and office side (except Accounts and Finance departments). For example, see an excerpt from an assistant manager's (plant side) interview (APM):

APM: We've reluctance in it. Then due to compulsion, we go there and feed the data.
I: What do you mean by compulsion?
APM: See we have to do this job as an extra work outside of our routines. So naturally there will be reluctance unless it gives us such a benefit. But, the committee (meaning MD & co-coordinators) is compelling us to finish this work somehow rather than doing it in the way we want. They want merely an integrated software. You just have to accept it.

A clearer expression of the top management's exercise of coercive power (French & Raven, 1956) came out in an interview with one functional manager (MM) and an HOD. See the excerpts below:

MM: I am totally against it. We say we have already signed, it is brought here, this and that, etc..all floppy reasons. That is it. Anyway, now, the management is trying to get it the way they want it by force.
I: What do you mean by that?
MM: My Georgekutty (researcher's pet name)….. The point is that none of us are satisfied with the party (Itech) and the way it is being implemented here. It should have been given to a good party and then our workload would have come down. Now, it is becoming just a linking software…that is what the management is imposing on us…if you oppose, you will be in trouble….they can play up your simple mistakes and issue you a serious warning memo..there are so many tricks…these things have happened here..there are living examples..see JK (MM went on with different individual's story of management's harassment)..*the point is, better you pretend that you agree with them*.

Below is another illustrative interview excerpt.

HOD: Here the practice is that if the top management says something, even if it's a folly you have to get done. We can't question the top management's decision. This is the concept of management here: the middle management is for execution of top management's orders. The top management is to order and the middle management is to oversee and the operational staff including workers is to do the work. This implementation is coming to a stage that the management is forcing its idea on us..*then we have to accept it or pretend that we accepted it.*

Again an excerpt from a corridor conversation among employees:
" These guys are simply integrating some hotchpotch stuff. Finally, we have to accept it. The higher-ups will get us to accept it."

At the same time, the top management, the ERP coordinators, and many middle managers started a discourse that since plant side did not have any IS, it should be satisfied with whatever IS it could develop with Itech. They added one more logic to this discourse: since the plant side did not have an existing IS and therefore had no familiarity with IS, it would be better for the plants to get an experience with the ERP as early as possible. This would help the plants to make better suggestions. The point was that the plant should focus on getting the ERP work as soon as possible. Below are some representative excerpts from HOD meeting and casual conversations among employees:

HPD (in HODs meeting): As all of us know, we don't have any system in our plants. So getting a new system itself is a big advantage for plants. The management expects plant's sustained and increased cooperation in this regard…We can easily see that the plants will be happy with the new system since we don't have any system on that side…I believe that the plants' urgent need would be to get a full-fledged ERP as soon as possible…This will also give more time for plants to be familiar with the ERP and create better suggestion for Itech engineers.

Here is a part of a conversation among a group of managers:

MCR: I think what Nash[25] (HPD) mentioned in the meeting is senseful..Hey, Rick (PM), it is really advantageous for you guys that you get it (ERP) run at the earliest. Forget the office. Their style of operation and their objectives are very different. First learn to stand up and then walk. You need just a system.
MM (intervenes): Usually I don't agree with Nar. But, in this case, I think he has a point. Maybe you guys should just go ahead with whatever you could get now. Then, you will know what you need..
PM: Ram (calling MHR), why are you silent..I kind of agree..What do you think Ram?
MHR: Frankly, I don't care. But, yah, I think even with what you have now (the ERP in the current shape) your work will get reduced. So why to create unnecessary troubles, just go ahead.

Notice how this sensegiving discourse tries to shape the plant engineer's interest and expectations of ERP. The discourse suggests that the plant's interest should be 'get the ERP working at the earliest'. *Consequently, this sensegiving discourse had two effects: a) the objective of ERP implementation or 'the problem' (Pinch & Biker, 1987) was getting redefined as the problem of just integration and not automation that implied that the level of automation achieved through integration is good enough for the plant side[26], and b) this redefinition, in turn, created a split in the employees' monolithic focus on significant automation across plants and office*. This, in turn, projected the difference in salience between the technology frame of the plant side employees (ERP as an information integrator) and the office side employees (ERP as a work automating tool and an information integrator). Note that in this process the plant side employees' technology frame became similar to the top management's technology frame, that is, the issue became predominantly information integration as opposed to predominantly work automation. Thus, there is a shift in the salience of technology frame (Davidson, 2002). Now, there was a difference between the interest of the plant side and the office side, which further isolated the office side from the rest of the

[25] To protect identity, all the employee names in this dissertation are pseudonyms.
[26] The implication of the shift of focus from automation to integration is that the number of data that user needs to input and the amount of work that the user needs to put in to process the data (e.g. number of mouse clicks) would go up. Also, the number of links between data would increase.

organization. Interestingly, knowingly or unknowingly, in an attempt to justify their lower enthusiasm with an information integrator as opposed to a significant automating tool, the office staff reproduced this discourse, and in turn, legitimated the plant side's changed interest or the shift in frame salience. For example, below are two excerpts from office staff's interviews.

Finance Officer: These are all factors. Then if they say, accounts is not co-operating… the thing is they are comparing us with the plant side…plant side can cooperate since anything they get is a plus for them since they do not have an IS. They had been doing it manually. They will be happy if they get any kind of IS. Their workload and time will be reduced any way. So, they can reduce their transaction time from 15 minutes to 10 minutes. Now, our need is different . We have fabulous ISs here. Our transactions take say only 3 minutes now. When the ERP comes it should be done at least in 5 minutes, if not in 3 minutes.

Accounts Officer: In the case of the plant there are no much problem since they don't have any existing IS. So their criterion is to capture as much information as possible. Even just an information integrator is a big boon to them. But, our criterion is to get a system better than our existing systems. We have to look for a higher level of automation.

Meanwhile, the work on the plant side progressed fast. The ERP coordinators and some other managers started positively commenting on the progress of ERP implementation (without specifying where it is happening: office vs. plant). But, during the discussion between the plant side employees and Itech engineers regarding modifying the software, there was a noticeable difference in the demands for automating work components. There was also a significant increase in the user intervention and user input (i.e., increase in manual work) in the software codes developed during this period. The increase in manual work, and decrease in automation, is a direct indicator of the shift of focus away from automation to integration. *Thus, as far as the plant side was concerned the technology frame of ERP as an information integrator reached its 'closure' (Pinch& Bijker, 1987) through a*

combination of coercion and persuasion.

The office side employees complained in the interviews that they are now being labeled as the problem makers both in the meeting and through flurry of notes. Meanwhile, the MD called the next meeting. One hour before this meeting, the office side employees who were opposing the management's move met with Assistant Managing Director (AMD), the second man in the company (the first man being the MD) and the representative of office staff in the top management. The employees apprised the AMD of the status of the development of the Accounts and Finance modules and that they had not been satisfied with the modules. Initially, AMD was not ready to voice their concern in the MD's meeting. Finally, the employees told him that if they were again labeled as "problem makers" which they anticipated, they would have to clash openly with the coordinators and the management with the support of political leaders. Finally, AMD agreed to take up this matter in the meeting on their behalf (Personal scribbles of an accounts officer, 2006; interview data). In the MD's meeting, the MD asked for update on the progress of implementation and the ERP coordinators showed the "commendable progress" on the plant side and reasonable progress on some modules from office side (except Finance and Accounts). The coordinators added that for testing the modules, such as Accounts and Finance, the concerned officers had not been showing up. Then, the AMD told that the module testing was pending because the Accounts and Finance staff's suggestions were not yet met and that no work had been done in that direction. The MD suggested a new format: Corrective Action Report that would show the modifications suggested (and who suggested it) and the corrective action taken by Itech engineers.

Irrespective of such issues, on the plant side, the ERP implementation had been

progressing well. During the development, there were again discursive attempts to shape the technology non-affordance that were similar to the attempts I described earlier. The result of all these dynamics was a mix of the practices originally built into the "standard" software and GovIndia's existing work practices. Employees realized this mixture in their trial use. In the grapevine conversations, they nicknamed the ERP software as "avial", name of a local vegetable dish famous for its mix of varieties of vegetables. Perhaps, such nicknaming or cynical remark also was an expression of their dissatisfaction with the software or resistance to the management (Fleming & Spicer, 2003).

5.8 Stage 5: ERP as a visibility and efficiency increaser

By this time the consultants and the ERP coordinators declared that many plant side modules were ready for "final" testing and subsequent trial use. Through the repeated (earlier) testing and trial use many employees had developed another technology frame: ERP as an employee visibility increaser. The employees interpreted the increase in employee visibility as a result of integration. I do not claim here that individuals *formed* this technology frame at this particular time or during this particular period. But, this technology frame appeared in the daily discourses increasingly during this particular period. The timing of this discourse perhaps is a signal that employees used this frame as a discursive resource, a political device.

The employees interpreted the intended result of the visibility increase as increased monitorability of the employees by the management. They anticipated the unintended result as peer monitoring. For example, see a representative excerpt from an interview with an administrative manager (PM):

I: For what purpose or why do we need that kind of detailed breakdowns?
PM: .. those in the top management..will become blind to small differences, for example, differences in the payment details. Unless they see the details, they can't question the subordinates effectively. They can't not only monitor but they also have to depend on the subordinates for explanation and take them in confidence. If they can see the details, there are no such issues. So the top management will become ignorant of so many activities unless there is a break down. So we need more break down.

Below is another representative excerpt from a casual conversation between two middle managers:

M1: ..Gop (MD's nickname) wants to know what happens on the ground..eyes into our ativities..both an integrated view and a detailed view..seems we have and we'll have more (work) breakdowns in ERP..Guy (the MD) can even screw us up..we'll start pushing each other..
M2: yah..chance for pulling each other's leg also will be then more..many can now peek into many others' job..

Unlike other managers, the top managers did not connect the suggestions to have more breakdowns with the intention to increase monitoring. Instead, they connected it with an efficiency concern. For example, below is an excerpt from an interview with the DGM:
" We have more breakdowns..more detailed record of who did what at what point in time…how failed, etc..this is not to punish anyone or even to monitor..in government you cannot anyway punish anyone..we are at the engineers' and workers' mercy..therefore, such breakdowns rather will help us take quick action and remedies..more work efficiency…ya..but anyway MD has the right and privilege to monitor anyone's task."

This rehashing of visibility into efficiency or coupling of visibility increase with efficiency increase occurred in many public talk irrespective of the hierarchical status of the speaker and listener. For example, see the part of a formal conversation between a manger (M) and a senior about the modification required in the ERP software:

M: So we'll have the machine or equipment breakdown: a record of who did the

maintenance, the history of breakdowns and a track of how many times the maintenance performed by a particular crew or employee failed. This will help us to monitor and take quick action.

In the above interview excerpts, we can notice two points: a) the choice to increase employee monitoring is interpreted as MD's right, and b) there is no mention of the negative impact of such potentially increased monitoring on employees. Many of the managers, engineers, officers, and TU representatives repeated the first point and mentioned that the issues such as the possibility of micro-monitoring need not be discussed with anyone since it is the privilege of the management to monitor employee activities. For example, here is an excerpt from a mechanical engineer's (ME) interview:

I: You mean your work getting more monitored or..
ME: (intervenes) certainly. Our work will become more monitored. But we have no scope for monitoring anyone. That is a very big drawback.
I: Monitoring whom? Your superiors or..
ME: (intervenes) What a joke! How can a subordinate monitor a superior..If you raise the increased monitoring, I mean by your colleagues, you must have noticed, you will be seen as a CITU guy[27] or a lethargic government employee.

The points such as a) the chance of getting categorized negatively (e.g., lethargic government employee) if one speaks against increased monitoring, b) the taken-for-grantedness of superior's right to increase the subordinate monitoring, c) the positive characterization of increased employee visibility and the resultant potential micro-monitoring of employees, were repeated many times. Below is another representative comment by an Accounts Officer (AO) during his interview:

[27] CITU is a left wing trade union which in this state has a bad reputation for taking money from people without rendering any service (Heller, 1999)

AO: We will become answerable for each act. Now, there is a check to be given to a supplier. 30 days are over and is still not given. If there is a system, that guy (MD) can see from there. Then there will be question, why the check is still not gone. Then we will have to find a reason. Now it is not like that. No one will come to know about it. Even if the supplier calls we will say, "oh! check has come. It will proceed in its own way". That is it. Instead, if the MD or the DGM calls you twice or thrice, on such matters, you will become extra conscious so as not to repeat such things. That is very good. That is not negative. The only negative aspect is cost.
I: How is it good?
AO: Haven't you heard this saying, "the lethargic government of employees are the curse of our country"…Unless forced, here, people won't work..such forcing will increase his efficiency, the company's performance and our country's performance.

Here, there is obvious mobilization and reproduction of the hegemonic discourses about right of the superior to asymmetrically (asymmetric because subordinate cannot monitor superiors) and closely monitor the subordinate without even prior negotiation about such increase in monitoring. The legitimacy of such increased monitoring is linked to public good and individual good. Interestingly, some of the managerial staff members reproduced the managerial hegemony discursively, along with many other managerial staff members, but resisted it (the asymmetric relations of dominations) behaviorally. The resistance manifested as attempts to reduce employee visibility to superiors and peers.

For example, here is a representative comment of an ERP facilitator from mechanical maintenance division during my conversation with him:
"If I make my activities more visible, that will generate a lot of headache for me. Therefore, I decided to minimize the links. Why to put efforts to integrate more, make us more visible, and get the displeasure of the management?"

Another facilitator, a plant engineer (PE)) remarked during his interview:
"We thought if this becomes visible to Instrumentation (division), we'd be in trouble. So we decided to replace the effort we put and cut down its links."

See another typical comment from a mechanical engineers' interview:
"If this thing gets to others, it'll cause you troubles. So we decided to replace the effort we put and cut down its links."

There were other strategies than reducing the connection (and in turn integration) that the negotiating employees followed: a) they provided less breakdown of activities than they could have actually provided (for example, the activities that were already standardized and therefore easy to code into the ERP software), b) they reported many activities as non-repetitive and thus having more variations, making it difficult for Itech engineers to standardize and code them into the software, and c) some employees also tried to get the software modified in such a way that it would reduce visibility of their actions. For example, see what happened to a junior engineer's (E) suggestion during ERP discussions in KOIN plant.

E: I suggested an individual level login. …..Most people opposed individual log-in.
I: What were their oppositions?
E: Who knows! Maybe some people want to work while others don't want…I came to know later..During our coffee break they scolded me for having behaved naively. They told the individual login would help the management pinpoint you individually.

Still another example from MIS's interview:

I: We were talking about the non-separation of LT-HT sub-module…
MIS:…they demanded separate sub-module login because they didn't want to be observed
by the peers. They usually postpone a lot of work [I confirmed it through personal observation]…Now, at any time, anybody in electrical (department) and the superiors can check on the readings entered and know who entered it at what time. This kind of checking they didn't want.
I: Did they tell you that reason?
MIS: No, they won't tell. How can they tell this openly? But I know since I was the HOD there. The objective was to avoid getting controlled.

MIS was correct. When I raised this issue in the engineers' interview (who demanded separate login) although they put forward flimsy technical reasons in the beginning, finally they told me that their main concern was about increased monitorability.

From the above-described attempts of the employees to reduce their visibility to the management and peers, it seems that while the employees discursively agreed with the taken-for-grantedness of management's right to increase monitoring without prior negotiations and the positive effect of such increased monitoring, they were also concerned about the potential negative effect, such as more employee control and work stress. Therefore, while the employees reproduced the hegemonic discourse of management's right, they behaviorally resisted the effect of the management's right and the espoused positive effect of increased efficiency. The employees exhibited their resistance by modifying the software to protect their interests. Therefore, at least to some extent, the negotiators' political interests decided the structure of the software codes (e.g. number of links) and thus constituted the software. That means the technology was not merely a symbol of employee resistance nor was the technology used as an immutable physical object to express employee resistance. Instead, the negotiators modified the technology to materially realize the employee resistance. In this sense, technology became a materialization of employee resistance. In other words, the ERP software by and in its constitution became another means for resistance, 'resistance by other means' as this chapter is entitled.

As I mentioned earlier, I suspect that the employees acts of reducing their visibility, and in turn, the strength of integration (for example, reduced number of links between data within a module and across modules) could also be a resistance to management's demand to focus exclusively on integration (against employees' desire) and thereby

increase the strength of integration and get the software running somehow. This suspicion is reasonable given that a) the employees interpreted the management's call to focus exclusively on integration (as opposed to integration and automation with more focus on automation) as the management's objective to achieve an integrated view, a visibility into the impact of an employee action on different functions of the organization, and b) generally, the employees had understood that one of the objectives of integrated software is to generate an integrated view of various activities that included employees' task related activities. In the next stage, the employees' highlighted the weak integration without mentioning the role of their visibility reduction efforts in producing that result.

5.9 Stage 6: From an exhaustive information integrator to a weak information integrator-ERP as a weak information integrator

The visibility reduction efforts had one more effect, perhaps unintended. It helped increase the cooperation between the consultants (Itech engineers) and the negotiating employees. The consultants had been trying to reduce the number of connections between different modules in order to reduce the complexity they had to handle and thus to save their time and effort. The resultant reduction in integration (due to employees' visibility reduction efforts and consultants' time and effort saving attempt) led to a dilution in strength of integration. This led to the emergence of a new technology frame—ERP as a weak information integrator. As in the previous cases, I generated the dimensions and properties by analyzing the data using Atlas ti software.

Before the weak information integrator frame appeared frequently in the daily discourse, the consultants had started the accounts module, finance module, and sales module. The consultants complained to the ERP coordinators about the "non

cooperation" of some finance and account staff listing down their names. The consultants also showed these staff members' regular absence as recorded in the attendance register. Subsequently, the coordinators sent memos to the staff members with a copy to the top management, FC and DGM. This further irritated the staff members. In general, the office staff interpreted this series of events as an attempt to reinforce the "problem maker label" or to scapegoat the office staff for the anticipated failure. For example, see below the excerpts of interviews with an administrative manager (DFM) and an accounts officer (SAO).

DFM: ..so far spent good amount of money..therefore, they need some one to scapegoat when questions come up. That is the fact. I mean finding a scapegoat. So *we decided to oppose more sternly* (long pause).
I: Sorry, am still not clear. Can you please explain?
DFM: Now, I can say that due to purchase department's lack of co-operation, I am unable to implement. Actually, if it is teamwork, it will be done nicely. But, in a government setup, it needs a scapegoat. It is a necessity here. What do we need? A system better than the existing system. No compromise on that. But, everyone knows that it (implementation) is going crappie…The blame will come upon MIS and HPD [who are the coordinators]…They are now pressed to pass that buck on. This is the game.

In the interview with SAO:
"Don't you see the flurry of notes (shows the file with all memos): "accounts department, come and check", "so and so from accounts department is not showing up". These memos go to the MD. What will he think? The accounts department is the problem maker. It reinforces the label they stuck on us in the meeting."

As DFC indicated this group, the finance and accounts departments showed their resistance in many ways. Here is a description of such resistance (from an interview with a Finance Officer):
" Of course, such resistance is the central point…If I should go there (the system room where the development and testing are going on) and enter all these reconciliation data, it is impossible; I won't do it. Not only I, most of us are not motivated enough to put such efforts. Instead of being motivated and rewarded, if I get only the blame and responsibility without any authority, anybody would only resist by doing our work like data entry slowly at our convenience. This is what is happening now—you know well the famous go slow strike in the government departments, don't you?"

See the same point in more detail (from an interview with an accounts officer):
" Once ordered, we have to go. So what we do is.. say one of my tasks takes normally

4 hours to complete. I will take that complete 4 hours and a little bit more, maybe 30 minutes, to finish it. Then, office hours (4:30 pm) will be over. Then, I will leave as soon as possible so that I don't need to put any extra effort. See it's not an intentional lagging…I mean it will appear..We truly have daily responsibilities for which each one is solely responsible…I cannot leave that aside. If some thing goes wrong in my daily work I am answerable. Also, by the nature of my task my higher ups cannot ask me to leave my work. Since I don't have enough time to finish my daily routines I am not going so frequently. It is not intentional. You got the point?"

Again, in another interview (with a finance officer):

SFO: ..when we are commanded, we have to go.. But then we will think how not to go for the next four turns. Even if we go, we won't give valuable inputs. But, that should not be the way. If I feel sincerely that it is my issue also, I will work even 24/7/365 days. I can easily manage all my daily activities even if I put such an effort. [I:. right , right….]
SFO: The problem is that there is no such support, no morale boosting, and no involvement.

By this time the consultant had requested GovIndia to make part payment for the "successful work" that they completed so far. The payment had to go through the finance department. I overheard the telephone conversation between the coordinators that expressed a concern that the finance officers might delay the payment due to their opposition with Itech's ERP implementation. The MIS (one of the coordinators) soon enquired the main finance officer of the status of the payment. The finance officer bluffed that he had already made arrangement to courier the payment check to Itech's headquarters (in another state). Then MIS asked the finance officer to handover the payment check to the consultants present in GovIndia. Although the finance officer did not agree first, against his will (as he mentioned in an interview), he handed over the check.

In another incident, it seems that a finance officer and an accounts officer influenced the network maintenance contractor who was networking the computer on employees work desk to the ERP server. The contractor told me that they asked him to delay the networking so that they would not be asked to put more efforts into the ERP implementation. In return, they offered him to expedite the payment that GovIndia

owed to him. The contractor delayed the networking by one week on some flimsy grounds. As the 'payment of bills' record showed, the contractor's pending bills were passed in a week. Recall that one of the reasons the office staff cited for not turning up in the ERP room (to do testing/trial use) was their unavoidable physical presence at their work location. They had complained about the lack of network between their personal systems and the ERP server. They had mentioned in the meetings that networking would have saved their time and enhanced their enthusiasm to test the software and trail use it. As a response to this complaint the management had taken steps to expedite the networking.

During this period some of the plant engineers as well as office staff who had been testing and trial using the software started highlighting the weak inscription of the information integrator, that is, the dilution of the strength of integration. For example, below is a part of a conversation among some plant engineers during their lunch in the company canteen:

E1: Hey Ram, you are right. I think they have not programmed the links we mentioned in the SRS. I also felt the same (weak integration) when I used my workspace (a portal in the ERP web page) in the morning. Then, what is the use of it..God knows..anyway, we can say we also have ERP.
E2: It's funny. I can send the data to the Technical. But, I cannot get the data I want from them. I think the boys [the ERP consultants] either didn't understand it or ..no, some of them seem to be technically okay..they know the software..at least, what it cannot do..[Note that the last sentence refers to shaping of technology non-affordance]
E3: (intervenes) I am not sure about their technical competence..did you hear the stories from office side..it is an utter failure there..the boys don't know what to do..I don't know what is happening..but I figured out this much: some legs and hands have been cut off…finally, we'll have some boxes [meaning independent programs] here and there..
E1: I don't know whether the Center [meaning the top management] knows it. Or maybe they are pretending that they don't know..because the guys [meaning the coordinators and the top management] have to make it a success, somehow. That's the move now.

From the above-described conversation, a representative of some grapevine talks that was being mobilized, it may appear that there is an ongoing sensemaking exercise—a

sensemaking of ERP as a weak information integrator. But, that is only one part. Given that a) the employees' efforts of visibility reduction partly caused the weak inscription, b) this point was not mentioned in the weak inscription discourse, c) instead the causality for weak inscription was exclusively attributed (although skeptically) to Itech engineers' lack of skill and understanding, d) some employees interpreted the top management's directive to get ERP as an information integrator and the management's associated acts as coercive and in conflict with the employees' interests, the discourse of weak inscription could well be a politically strategic 'sensegiving action' (Gioia & Chittipeddi, 1991) to influence others' interpretation of ERP. Note that in this sensegiving attempt the employees were using a previously appeared technology frame, ERP as an information integrator. But they used this technology frame with a slight change that highlighted the weak translation of this technology frame into software codes. Thus, the modified technology frame became, ERP as a weak information integrator, the result emerged from employees' sensemaking about the change in the strength of inscription. *Therefore, the employees strategically used technology frame as an emergent sensegiving discursive resource to influence others' interpretation of ERP, and in turn, the ongoing negotiations about ERP modification.* I made the same argument during the analysis of the earlier stages too. In this particular context, the employees' sensegiving attempt seems to be an act of employee resistance as well. In the following paragraphs, I give more details to support these arguments.

As it occurred in the case of other employee discourses, the morning chat near the ID card reading machine (swiping machine) served as one of the instruments for mobilizing the weak inscription discourse. Now, this location of grapevine achieved a special significance since the ERP coordinators identified it as a 'dangerous spot'. Consequently, as per HPD's request, the Personnel Manager issued a memo to

GovIndian staff that read: 'The management has recently noticed that the area near the swiping machine in the main building has increasingly become a place for holding unwanted and unproductive discussions during shift change. Therefore, all employees are requested to use this area exclusively for the swiping purpose and to abstain from any unproductive discussions and comments' (GovIndia Memo 16/345-08 dated November 5, 2007). Some of the office staff members as well as plant staff members responded to this action negatively. See a typical comment: "So they [the management] are trying to crush our spirit. I am not going to stop my chat! That is the only place where I relax quite well".

Meanwhile, in the next meeting (November 7, 2007) the ERP coordinators claimed hat the plant side implementation was almost complete. Left out were some modules in Accounts and Finance. They added that if the Accounts and Finance put its sincere efforts, the implementation could be finished in a month. Therefore, the MD fixed December 4, 2007 as the date when the ERP system should go live in GovIndia. Before fixing the deadline he did not check its feasibility with the employees involved.

Even if the MD had checked the feasibility in the meetings,

"here, no one usually dares to say we cannot meet the deadline when MD or DGM fixes it. Saying you can't meet deadlines will bring you all troubles….But, you know, the other side..that everyone including the MD knows that it is impossible to meet deadlines. The deadlines are just for namesake. You need to hit somewhere around. If you can't even hit around, no worry, just give some explanations" (excerpt from an interview with a store officer).

Since the MD had another meeting outside of GovIndia, he asked DGM to continue with the meeting. Although the office staff and the plant staff kept quiet when the MD was present, just after the MD left, they started pouring out their complaints. The plant staff reported that many of their functions had not been coded into the software. The accounts and finance staff argued that they could not progress as much as they planned due to the absence of data from other modules. They complained that the absence of links unnecessarily increased their effort, for example by necessitating entry of

duplicate data, and as a result, ERP had become a weak information integrator.

Subsequent to the meeting, many employees started talking about the "missing links" and "weak information integration" more frequently. For example, see a complaint from an HOD in an interview:

"Now, what is done for us? --the MPR. The issue is we can raise the MPR but the purchase or any other department cannot come back to us with queries or modification. Then, what is the use of it? There is no integration as we expected…After the meeting [the meeting mentioned above], people started realizing this fact".

The Finance and Account staff vociferously complained about the weak integration in informal discussions with their colleagues. Here is a part of a coffee time conversation between an administrative manager (DFM) and two functional managers (PM1 & PM2) in the company canteen.

DFM: The links are missing. Why are they missing? Due to our bad communication or no communication, or they [ERP consultants] are unable to comprehend what we explained or something else.
PM1: Maybe there are some limitations too as the boys say. They are now working hard. I think they cannot reverse the earlier integration efforts. That is a big constraint.
DFM: I agree. There might be some limitations with the system. But, as Reemy and others said, that could be a pretext to mask the boys' lack of capability….but the point is that the integration has become very weak…but, what we wanted..and what we want..is a fully integrated system. Don't you think so?
PM2: What is the point in holding on to that. They are forcing it to success. Be prepared to accept whatever way it comes out..weak or strong, information integrator or coffee maker..

The issue of weak information integrator came up frequently in the interviews, especially in the interviews with Accounts and Finance staff. Here is an excerpt from one senior finance officer's interview:

"Computer can take care of duplication of work; but the problem is that they [the ERP consultants] have not understood the link [so same data is captured many times or users are asked to enter the same data]. This is causing work duplication. Something we are purchasing. P.O. is raised, the same thing comes to the store, the data from store comes to bills, the data from bills goes to payment. All these should be linked properly. Those links are not properly made and the lack of the links leads to dilution of integration."

In a meeting with Itech's business manager, the officers from Accounts department, Finance department, and Purchase department threatened Itech that none of them

would sign off on the customer satisfaction sheet until Itech had met their expectations. As per the work contract, Itech could get the second term of payment (50% of the total payment) only after they got the customer satisfaction sheet signed off by each senior officer in the department. Therefore, Itech had no option but to meet the customer expectations. This expectation was a 'system better than the existing IS'. In my interviews and other meetings the staff expanded this criterion of better IS in terms of a) integration: number of data transferred across modules, number of data that the system could automatically transfer across modules without user intervention, number of existing sub functionalities covered by the ERP, b) speed of data processing, c) degree of work automation, and d) user friendliness. The office staff continued with its strategy of 'finding fault with Itech'. One of the major faults was Itech's lack of understanding about the GovIndia's existing system, which in turn, the office staff argued, resulted in a weak information integrator.

Meanwhile the top management held its internal meeting. Based on the meeting, MD distributed 'the responsibilities for further implementation' from the ERP facilitators in different departments to the 'others who had been more involved in the implementation'. These 'others' included the Accounts and Finance staff who had been propagating the weak information integrator image. The memo from the top management asked these individuals to report directly to the MD. See an accounts officer's response to the management's act (during an interview):

"After we co-operated so much in the beginning irrespective of all bad things like lack of appreciation and the problems with the consultants, if the management responds like this, what can we do but to resist? Their (the management) agenda is to bring the system into life within a short time. This is true with Itech too. We too share that desire but not by compromising our requirements… See, last time, MD fixed a new deadline, December 4 (2007). MD is least aware about the problems and the ground reality. Some modules are still under development. Without at least 3-4 months parallel run the system cannot come into life. Instead of pressing us, as I told you sometime back, somebody concerned should stop pretension of sleeping, rather open

his eyes to the reality. This is part of the pressure tactics. We told our boss that right now 95% of our works are beautifully running on the existing systems. Although it is on an obsolete platform, it brings about results. True that we have only trial balance not actual balance sheet. But, in excel I have developed another code to prepare balance sheet automatically from the trial balance. What I am trying to tell is that it is running well and so we are looking now *as a compromise for a system at least as good as this one*. Otherwise, if some problem comes up tomorrow, there will be questions like how you singed it off, then we will be answerable".

The same officer along with other officers had been projecting another expectation until now. See an excerpt from his earlier interview:

"In case of other department (mainly from plant side) there are no much problems since they don' have any existing IS..But, our criterion is to *get a system better than our existing IS*. Unless we get that we decided not to sign off. There *is no compromise on it*".

The lowering of expectation, from a system better than the existing system to a system at least as good as the existing system, is more visible if we compare the earlier interviews with the later interviews. Below, Table 5.1 (next page) shows some representative quotes that reveal the spread of the lowering of expectation across the office staff.

TABLE 5.1 LOWERING OF ERP EXPECTATION AMONG OFFICE STAFF

Expectation 1 vs. Expectation 2 (representative quotes)	Status of the respondent	Attributed Reason for the change in expectation
This is what we heard and we expected: a system better than our existing ones. But, now I know it is impossible here. Now, our expectation to get at least what we have in our existing system	Accounts Officer	Realization that Itech is incapability to meet the "better than expectation"
We have a brilliant system, We need one better than this. (quote from time 1)…at least one that matches our existing system (from time 2)	Functional Manager	Realization of Itech's incapability (#1) Management's force (#2)
We should these things at any cost since they are already available in our Flicker. Our earlier expectation was to get a system better that Flicker…yes, we had to change this	Accounts Officer	Realization of Itech's incapability (#1) Management's force (#2)
Our criterion is to get a system better than this existing one (quote from time 1)..As a compromise, now we are looking for a system as good as our existing system (time 2 quote)	Finance Officer	Realization of Itech's incapability (#1)
Now, they say it is not possible to do that..this is a blow to our expectation, a system better than the Paradox in some aspects..(time 1 quote)…they have to do this..we need a system that gives at least the existing features and speed	Assnt. Administrative Manager 1	Realization of Itech's incapability (#1)
Here we are getting a 3+ (with the existing system). Now, we need a 4+ (time 1 quote)…Now our transaction takes only say 3 minutes..we are compromising..in ERP it should not take say at least more than 5 minutes	Assnt. Administrative Manager 2	Realization of Itech's incapability (#1)

From the analysis of the data (using Atalas ti software), I found that the reasons attributed for change in the evaluation criterion and the corresponding image of ERP (from strong information integrator to weak information integrator)--two elements of

technology frame--are a) sympathy towards Itech's "boys" because of their precarious position, b) disappointment over Itech's incapability to meet the expectation and consequent adjustment of expectations to make it more "realistic", and c) force by the management. The third reason, the management's force, was mentioned less frequently (frequency of a: 30%, frequency of b: 50%, frequency of c: 20%) compared with the other two reasons. Interestingly, although not in connection with the change in the expectation (from a better IS to an IS as good as the existing system) and the image (from strong information integrator to weak information integrator), the office staff had mentioned that they had felt being forced by the management to accept management's suggestion to make the system work somehow. Therefore, the role of coercion in bringing about the change in technology frame and its gradual acceptance warrants more clarity.

If we look at the first two reasons, they are closely related. The first argument was that by this time the GovIndia employees realized that the "boys" a) were not paid well (salary was USD 2400/year while average salary of fresh software engineers was USD 3600/year), b) were pressed by their MD to finish the job as soon as possible, and c) had been putting much effort to meet the GovIndian employee expectation. In this precarious situation, even if these software engineers had been putting much effort, given the time constraint and the lack of monetary incentives to motivate them, setting higher levels of expectation seemed practically not feasible. The second reason is just an expansion of the first reason—the assessment of the consultants' incapability reinforced the practical infeasibility in getting a better system. But these pieces of information were not new to the office staff. The interview data show that they knew the 'boys' 'precarious situations' (about eight months back). If the availability of these pieces of information is the reason for the change in expectation and the acceptance of

a weak information integrator, it is not clear why the office staff took eight months to lower their expectation. Moreover, the assessment of Itech's incapability is not a recent exercise. GovIndia employees had made Itech's incapability an issue during stage 2. Therefore, although the realization of practical infeasibility might have been a reason for lowering the expectation, it is not the proximate reason with respect to the time of occurrence of the expectation lowering.

The next attributed reason was the issue of sympathy toward the precarious boys. This is an interesting point since during this stage the ERP coordinators, some members of the top management, and some managers had been pointing out the precarious situation of the "boys", hailing the efforts these boys had been putting. For example, see a representative comment during casual conversation among managers:

MIS: One should also take into account the boy's situation. Still, they have been putting sincere efforts. I saw them burning their midnight oil..At least their effort is worth the money we paid them" [This comment was partly targeted at the argument of some employees that GovIndia wasted money in giving contract to Itech]
SS: Hersh has a point. I agree. We need to consider these boys more fairly. I think we got back some of our investment.
DM: But the point, Hersh, is that in software implementation it doesn't matter how much effort you put. What matters is whether your are able to produce the desired result…they are putting more efforts because they don't have the capability to do faster..very simple.

Like DM, many employees who cited sympathy as a reason for the lowering of their expectation, had publicly talked against the need for sympathetic consideration. Therefore, we should at least suspect the genuineness of these employees' causal attribution to sympathy. Moreover, as I pointed out in the beginning of the above-reproduced conversation and as it is obvious from the conversation, it was the top management and ERP coordinators and their supporters who propagated the sympathy argument. Also, this discourse interpreted the 'stickiness of Accounts and Finance

with a system better than their existing system and the corresponding non-cooperation with the boys' as unsympathetic and unethical. The discourse juxtaposed this unethical behavior with three other points: a) it is the top management' right to command the subordinates, and in the GovIndian culture, it is the duty of subordinates to obey such commands, b) those who delay ERP project with unreasonable demands are putting GovIndia into a worse financial situation while it is already reeling under financial pressure, c) unnecessary opposition to modern technology implementation is the traditional belligerent TU style which has proven to be destructive. See some representative examples below:

An excerpt from my interview with a mechanical engineer (ME):
ME: ..[a]ctually, what they (managers including the top management) say is correct. We have no right to resist because it is there in my work definition that to do whatever the management demands from time to time is my duty. Therefore, even if we get more work through this computerization, we have limitation in resisting. No one can and should go overboard…
I: When will you say someone or a group has gone overboard?
ME: That just all of us know..from our experience. We can air our oppositions, but if the management compels..we should yield. The responsibility of the final decision, anyway, lies with them. They have the right to compel and then we should not oppose further..Maybe that kind of overshooting occurred in this computerization…I don't want to judge others and name them..yes the office side had to have a different criterion..but maybe it is time to wrap up too..otherwise it is running into too much (financial) loss!

An excerpt from my interview with a functional manager (MM):
MM: "As far as a GovIndian employees is concerned, the owner is the MD. From the first training onwards we have been told when you pass the gate of GovIndia, remove your cap and put on the company's cap. Cap means policy. That means if the MD is a thief, we have to help him steal. That is our duty. Here, the policy of the lower rung is the policy of the higher ups. This is the tradition. Whether you like it or not..you have to accept what the top says.. no point in sustaining with belligerence..now it's no good to anyone..
I: Why?
MM: Anyway, now it 's working fine in plants.. so you should assess these boys on a fair basis..modern technologies are a necessity..so why to fall again into the old trap (referring to TU's opposition)..it's time to go forward now..

This discourse not only characterized the management's commanding and coercive acts positively while the resistance of office staff negatively, but also signaled that the top management's action against office staff's resistance had been legitimate. In other words, the discursive attempts to shape the employees idea about what factors should or should not be considered in technology implementation, and in turn, what technology frame should be accepted and what actions should be considered right or wrong legitimated the management's coercion of the office staff, especially of Accounts and Finance staff. There are two more points to note here: a) the use of the hegemonic discourse (e.g. belligerent TU style repeated, the opposition to managements' stand adds to financial loss, the management's right to force/command and the employee's responsibility to obey) that tried to legitimize the management's action, and b) a reduction in these staff members' support to Account's and Finance's opposition. In other words, as these excerpts indicate, the use of the hegemonic discourse led to de-legitimation of Accounts and Finance staff's resistance (towards the acts of the consultants and the management).

Coupled with the awareness about the loss of support, the Finance and Account staff came to realize that they were getting isolated and increasingly seen as the "problem makers". See some excerpts from the interviews/casual conversations with the Finance and Accounts staff from different divisions:

DFM (Finance dept.): I told you earlier, right? The game is clear now (referring to the game of scapegoat). One stage is done. We became the scapegoat…We did this (referring to oppositions) not just for ourselves, as now people project. We wanted a better system for all of us, for GovIndia..But, now things are not going that way..people lost interest in it..except we at Finance and Accounts..why should then we fight?

SAO (Accounts dept.) : Everyone here now knows that the ERP did not meet our original objectives. So now they need someone to bear the blame. And they found

it..unfortunately, in us..this is the government culture..finally, those who are really sincere will be left alone..none will be there to support you..Then..finally you too change your stand..why shouldn't you change? What do you get if you don't change?..only blames from all sides..

SFO (Finance dept.): Their (the staff from plants) criterion had been different. Unlike us, they don't have any IS. So whatever they get is good for them…but, you should not and cannot apply the same criteria everywhere…but you know, this is a government company, unlike in multinationals, the normal reasons don't work here. Politics, only politics work here..you should know how to play the game. So far we played it pretty well.not for retaliating..but for the benefit of everyone..now the battle is nearly lost, but not completely...we became the problem creators..now in everyone's eyes!..better we yield now..we can demand a system as good as the one we have..that should be and that is appropriate. Don't you think so?

SAO (Accounts dept.): So now, we don't say that they (the consultants) don't have the capability to give output (which these staff members projected during earlier stages). We just say that in the current situation we have not got any output. We shouldn't reject some one outright. That is unfair. That is why we now say to bring people who can do things faster and better. We can't say get out to the people who came here to do ERP. Since it is the top management's decision, we cannot say so. We can just say that we are not getting what we expect…we did compromise our expectation to avoid unnecessary fight. This is our current stand.

The same staff members had mentioned earlier that the reason for lowering their expectation (from a system better than the existing ones to a system at least as good as the existing ones) as sympathy towards the hardworking consultant boys who were in precarious situation. But, the above excerpts make me suspect that the Accounts and Finance staff members' awareness about their losing legitimacy motivated them to lower their expectation. *Thus, perhaps, the lowering of expectation was either a strategy to regain the losing legitimacy or a give-up, or simply a change of mind. However, its unintended paradoxical consequence was that, in fact, it further legitimated the management's coercive actions. Many people interpreted Accounts and Finance staff's change in stand as their understanding about the situation, the situation as the management defined it (e.g., the three points in management's discourse: the ethical treatment of the consultants, the financial loss to the company,*

the management's right to force). This interpretation, in turn, reinforced the taken-for-grantedness of management's right to command and the management's legitimacy to coerce vis-à-vis the Finance and Account's de-legitimacy in exhibiting sustained resistance to such coercion.

Below are some representative excerpts from the interview with an accounts officer (AO) and Assistant Manager from plant side (APM):

AO: I heard it straight from the horse's mouth that they had decided not to cooperate with this project. I too supported. But, now they realized that they have gone a little too much, if not too far..These poor boys were made scapegoat in the fight of egos and personal interests. That is not right..The IS experts here now started feeling the loss of their grip over so many things. The point is that they were kings here, who are now becoming pawns. So they wanted to slow down the project to the possible extent and play all possible ways to do that before they yielded…Everyone expects and accepts that politics...but they went a step beyond..once the MD commands, you should understand it..Now, they are getting it..see how they are cooperating now..they want at least a system good enough for their work..that is fine.

APM: Many of us are now clear. One of the factors that contributed at least 50% or even more to the delay of the project is our own non cooperation, especially from office side. …Also, projecting the issue of the consultant boys' technical inability has gone way beyond without considering their situation…Yah, all of us did that.. Now, you see there are apprentice girls doing all that input…It's financial burden on the company and the public. Now, office side, and we too, realize it. Management had to simply force the office staff to cooperate…But, that is what the management is for..get things done.. Now, you see recently the MD himself has been tackling them. That is the way it should be done when it goes beyond a limit…I am don't mean they are bad and we are good or anything like that..We all play and played..now, our friends (office staff) and all of us understood that we went a bit above..

In short, as a result of this legitimating-delegitimating activity, Accounts and Finance staff members not only lowered their expectation and accepted the increase in user input (manual work) but also increasingly cooperated with the Itech engineers to encode a "(weak) information integrator" and trial use it. Below is a representative

example from my discussion with an administrative manager regarding the increase in the user input for billing module:

"Right, right. So we suggested like this: put code at least in the case of items that are frequently repeated. For example running of the ambulance [which is a contract work] for which payment has to be made. At least to that extent our work will be reduced. We understand that it's a compromise. Okay. As they (consultants) argue, in the case where there are many small works grouped together, we'll work manually. Now, we are ready for that. Our aim is not to put others in trouble, neither the boys nor the management."

Note that during this stage the management used hegemonic discourse to create legitimacy for its coercive actions. *It is obvious that when legitimated, coercion could be effective in producing a consensus, but not genuine or normative (Haugaard, 2006), about what the technology should be (automating tool vs. integrating tool). Therefore, apparently shared consensus about what technology should be or perhaps what technology is may be constructed through an institutional mode. It means that apart from the cognitive mode of creating shared consensus on meaning of technology or in the social construction of technology's parlance "redefinitional closure" and rhetoric mode of creating closure—"rhetoric closure" (Pinch & Bijker, 1987), there may be [the default option is] an institutional mode of creating closure. I call this closure, "institutional closure*[28]*".*

5.10 Summary and discussion

The hallmark of ERP implementation in GovIndia is employee resistance. The case study illustrates how technology becomes a resistance by other means. I summarize my analysis of this resistance through an action-response-result framework in table 5.2 (next page), and I boldface and italicize my findings in the following paragraphs.

[28] I am indebted to Prof. Trevor Pinch who suggested this term.

TABLE 5.2: SHIFTING TECHNOLOGY FRAMES AND THE RESPONSES IN GOVINDIA

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5 (*)	Stage 6 (*)
TF: Exhaustively automating custom-made info integrator	**TF**: partially customizable info integrator	**TF:** partially automating info integrator	**TF:** (Mostly) an information integrator	**TF**: visibility & efficiency increaser	**TF**: weak information integrator
Actors Employees Coordinators Itech employees	**Actors** Employees Itech engineers Itech manager	**Actors** Employees Coordinators Management Itech engrs	**Actors** M.D. Employees Itech engineers	**Actors** Plant staff Office staff Management	**Actors** Plant & Office staff A/c-Finance staff Management
Action-Response **A1**: Bidders' sensegiving: their ERP as significantly customizable **R1**: Employees' accept and make sense in same way **A2**: Itech & coordinators sensegiving integrated s/w as ERP **R2**: Employees' accept and make sense in same way **A3**: Itech's manipulation: attempt to retain SQC standards **R3**: Employee opposition & insistence on completely customizable ERP **A4**: Itech's opposition **R4**: GovIndia's threat **A5**: Itech yields and presents their response as responsibility to customers	**Action - Response** **A6**: Itech manager-Itech engineers' sensegiving : their novel ERP software (s/w) as rigid & complex + intentional distortion of information **R6**: Employees' reprodn of the discourse	**Action-Response** **A7**: Employees semsemaking-sensegiving: ERP partial automation, resistance to partial customization & demand for more customization **R7**: Coordinators' use of Itech's "system limitation" discourse **A8**: Accounts & Finance staff's assessment of the discourse as political (to hide Itech's incapability) + questioning of Itech's claims of ERP + Discourse on Itech's anticipated failure **R8:** Repetition of R5 & A6, mgmt. issues memos & employees reduce cooprn	**Action-Response** **A9**: Change in implementation strategy (office modules in low profile) + MD's directive to focus more on integration (than on automation) + Institution of attendance record **R9**: Plant employees & some office staff increase cooperation with Itech's focus on integration **A10:**Mgmt.'s sensegiving: Plant needs just an integrator soon **R10**: Plant's increased cooprn. **A11**:Coordinators label A/c-Finance staff as "problem makers" **R11**: The staff oppose, delay Itech's payment	**Action-Response** **A12:** Employee sensemaking –sensegiving using the frame ERP as visibility increaser-efficiency increaser **R12**: Employees' attempt to reduce monitoring through reduction of integration (resistance to mgmt's frame imposition)	**Action-Response** **A13**: Plant staff's sensegiving: ERP as weak integrator + Office staff's reproduction & use to project it as a failure + A/c-Finance staff insist on meeting their expectation **R13**: Top mgmt gives staff individual responsibility & direct reporting to MD + legitimation of mgmt coercion of A/c-Finance staff, de-legitimation of the staff's resistance using hegemonic discourse

In the figure, the link between the action-response cells--a picture of the political strategies that various actors played—and the result cells suggests that ***the ERP implementation in GovIndia was significantly an outcome of a power play among the actors. This power play was a process of multiple actors shifting technology frames over time in their attempt to impose the frames that embody their interest over others' frames***. ***Thus, in this process, actors used technology frame as an emergent sensegiving discursive resource*** to influence others' interpretation of the ERP. For example, during stage 1, Itech-ERP coordinator coalition proposed Itech's software as a "significantly customizable ERP software" (as opposed to other ERP software programs available in the market). Itech also tried to manipulate around the popular meaning of ERP (ERP as a standard software) in order to retain the practices they had already programmed into their "standard" software. When GovIndian employees resisted Itech's manipulation attempt, through sensegiving discourses Itech shifted the frame to a partially customizable software (stage 2) due to the inherent nature of their novel technology ("system limitation"). This was against the employee expectation of a completely customizable ERP and the employees responded to Itech's strategy by framing ERP as partially automating software (stage 3). Such framing implied that Itech's software is a failure to meet GovIndians' (including the management) long-held expectation of exhaustive automation. The employees used this frame also to demand for more customization, and Itech repeatedly used the logic of "system limitation and the frame that embodied this logic. Some of the employees (particularly, Accounts and Finance staff who had IT exposure) questioned the "system limitation" logic assessing this discourse as a political strategy to mask Itech's incapability. Here, note that along with the technique using frames (or

framing), the employees employed other discursive techniques such as counter discourse to Itech's system limitation discourse, discourse on Itech's anticipated failure that also questioned Itech-coordinators' claim of Itech's software as ERP. At this point, the management starts using coercive means, for example, issuing warning memos to the opposing employees for on the grounds of their no-show for testing the software. Consequently, these employees reduced their cooperation with Itech engineers.

Now (stage 4), the Itech-coordinators coalition changed the implementation strategy bracketing out the implementation of Accounts and Finance modules where they faced maximum opposition. But, perhaps, as the coalition claimed this change was due to functional reasons (e.g., non-availability of Itech's Accounts & Finance experts, and Account and Finance modules' need of more data from other modules). Whatever is the reason, at this point, the M.D. explicitly framed ERP as a mere information integrator and MIS report generator that carried the top management's interests. This frame shifted the salience from automation (in the employee frame) to integration. The M.D. "directed" (Minutes of HOD meeting, October 22, 2007) the employees to cooperate with Itech to realize this frame as soon as possible. The management used this frame to mobilize a sensegiving discourse that shaped plant employees' needs as just an information integrator. This was an attempt to align plant employees' interest with that of the management while bracketing out the office staff. The management's labeling of the office staff as the "problem makers", which the staff resisted through various means, is an example of such bracketing. Further, the top management combined this discursive technique with coercive means (institution of attendance record to monitor the employee cooperation) as they did earlier.

The next two stages (stage 5 and stage 6) occurred nearly simultaneously. The employees resisted the management's coercion by framing ERP as a weak information integrator (stage 6) and using the frame to show that Itech had not met what they agreed to in the contract—to develop an ERP better than the existing information systems, a strong information integrator and a significant automation program. Thus, in these employees' interpretation the management was permitting a contractual violation. Interestingly, the weakening of integration was partly due to the employees' own efforts to reduce the number of links between different modules and within modules. The attempt to reduce integration was a manifestation of employee resistance towards the management's attempt to impose its frame of "ERP a (mostly) information integrator" that shifted the focus from automation (employees' demand) to integration. The attempt was also a manifestation of employee resistance in the sense that they intentionally tried to reduce the potential of the software to monitor their activities closely. Thus, the frame of "visibility reducer" implicitly carried the employee concern for the ERP's potential to increase employee monitoring.

In sum, ***actors used technology frames as an emergent (in the sense that it emerged from actors' ongoing sensemaking) discursive resource through framing it in a way that embodies their interests and employing it for sensegiving purpose***. The intended (as well as actual) result was a shifting of technology frames over time. Although this persuasive discursive technique was a significant repeated strategy, whenever the actors assessed that the persuasive strategy was not as effective as they expected, they also combined it with use of coercive means to realize their goal--acceptance of their technology frame (that manifests as a "consensus"), and in turn, its translation into the ERP software. For example, in stage 1 (refer table 5.2, column 1-stage 1: R3-A4-R5-A5), when Itech opposed the employees' demand for a completely customizable ERP,

the management threatened Itech and made them accept GovIndia's technology frame—ERP completely customizable software without built-in standard practices. Similarly, in stage 4 (refer table 5.2, 4th column-stage 4:A9-R9), the MD's directive to accept the top management's technology frame of ERP as mostly an information integrator (as opposed to the employees' frame of ERP as an automating tool) was explicitly supported by use of a coercive means, attendance record that was expressly used to monitor employees for their cooperation with Itech engineers. The employees too perceived it as a coercive tool and responded to it pretending that they agreed with the management's technology frame. Further, the management issued warning memos to those who opposed the management frame, for example, the office staff and in particular the account and finance staff. When the resistance increased the management legitimated this coercion using hegemonic discourses (for example, the discourse about the management's right to increase employee monitoring and the employees' duty to obey; opposition to modern technologies such as ERP is the destructive belligerent TU style). The result of the legitimated coercion (and the raw coercion) was an apparent (or non-genuine) employee consensus with the top management's frame. The social construction of technology (SCOT) literature and the information system literature show that such shared consensus is created through cognitive problem solving (called redefinitional closure in SCOT's language) and use of rhetoric, (called rhetoric closure in SCOT's language). ***In addition, my analysis of GovIndian implementation suggests that shared consensus on the meaning of technology (broadly technology frame) could also be created through institutional coercive means. That means there is a possibility of an institutional closure.*** In GovIndian case, it is the combination of discursive persuasion and coercion (raw and legitimated) that generated and sustained a consensus on technology frame. We can see a parallel argument in the Industrial Relations literature. For example, Graham

(1991) and Kawano (1993) show how the worker consensus to management strategy in Japanese automobile industries is an outcome of both persuasion and coercion. In critical sociological studies, the argument about the combination of persuasion and coercion, particularly legitimated coercion, in generating and sustaining consensus is still older. For example, in the context of analyzing hegemony, Gramsci (1924/1975:762-63; 1971:170) notes: "hegemony…is characterized by the combination of force and consent, which balance each other reciprocally, without force predominating too greatly over consent ….force will appear to be based on the consent of the majority". In this process consent is manufactured (Burawoy, 1984), consensus is mobilized, and popular support is attained. In sum, I suggest a possibility of institutional closure and the use of force (or coercion) and consent (or persuasive rhetoric) to create a consensus on technology frames. There is an implication in order. The role of coercion in creating consensus could limit the spread of sharedness of consensus (how widely it is shared), and in turn, sensemaking (how collective the sensemaking is) to a minority of actors. Thus, it could question the breadth of sharedness, a fundamental assumption in the sensemaking literature (Weick et al., 2005).

I started this summary discussion with the broader argument (the first bold-faced argument in this section) that cuts across all the stages of implementation. Subsequently, I presented an argument that is confined to a few stages. In this paragraph and the following paragraph, I sustain with this style of narrowing down. In the detailed analysis, I noted a particular characteristic of the sensegiving discourse—the "system limitation" discourse--that the ERP consultants (Itech employees) employed. For example, in stage 2 (refer table 5.2, 2nd column A6-R6), in order to reduce the customization efforts, Itech's business and technical manager "educated"

the GovIndian users that Itech's novel technology has a lot of limitation that imposes constraints on the level of customization and automation. Itech engineers used the same discursive strategy that was intended to create a perception that the technology by its inherent nature does not afford certain actions. Drawing upon human-computer interaction literature, I called this perception as "technology non-affordance". Itech engineers used this discursive technique repeatedly across the stages (stage 2, stage 3, and stage 4). During stage 3 (refer table 5.2, 3rd column, A7-R7) the GovIndian coordinators also used this discursive technique to soften the employee resistance and the employee demand for more customization. These discursive techniques had its intended effect only to some extent. Instead, it met with employee resistance (see A8 and R8). It also had an intended indirect effect—the generation of a new frame, ERP a partially automating software. In short, the attempt to create technology non-affordance was a repeated significant strategy that the system professionals (Itech engineers) employed. In technology implementation literature as well IS literature, scholars have described various strategies that the system professionals use to protect their interests during technology implementation. For example, Bloomfield and Danieli (1995) show that IT consultants (or system professionals) discursively create and reaffirm the boundary between the technical and the social that supports their professional identity as both technical experts and organizational (social) experts. Thus, the consultants create an independent existence for the technology as well themselves. Adding to this stream of research, my study shows that down the line, the consultants create a perception of technology non-affordance about the "independently existing" technology that they created. This, ***the creation of a technology non-affordance, is one of the prominent ways system professionals exercise their expert power over other actors through discursive means.***

Now, consider stage 4 (refer 4th column in table 5.2, A12-R12-Results). During stage 4 when the visibility increaser discourse was at its peak, we have seen how GovIndian employees' interests to protect their privacy against the increased peer and management monitorability resulted in reduction of number of links between data, and in turn, a weak information integration. The employees realized their resistance to the peer and management monitorability through changing the basic nature of the technology (one of the basic nature of ERP software is its strong integration of data). Thus, the new ERP software was partly a direct result of the material realization or in other words the materialization of the employee resistance or the political interests of the negotiating employees. In this sense, partly, the ERP software was a material expression of the employee resistance. Such a change was easier or even perhaps possible partly due to the willingness of the ERP consultants to make such changes, the willingness that came out from the consultants' self interest (interests to reduce their time, effort, and expense). This is the context in which the materialization of political interests occurred. In short, ***in certain contexts, technological artifact may become a material realization or materialization of the political interests of the negotiators involved in technology modification.***

Having used the action-response-result diagram (table 5.2) to describe my detailed analysis more parsimoniously, and to evince my findings, in this paragraph, I further abstract the political process of implementation (refer figure 5.1) from table 5.2.

In table 5.2, in each column, there is an approximate sequential flow that starts at the top with framing of technology frame (a structure that carries the framer's political interests), which is an outcome of an actor's (e.g., consultants or employees or management) 'cognitive sensemaking' (Weick et al., 2005). Since either technology

frames or some aspects of technology frames emerge in this process, I call this phase 'emergence of frames'. This is followed by political strategies that various actors play in order to mobilize other members' (or groups') interest to form coalitions and to consolidate their interests and interpretations, where in consolidation means the attempts to not only legitimate one's interests and interpretations but also exclude the interests and interpretations that are in conflict with one's own even through coercive means. The mobilization of interest and its consolidation leads to creation of a consensus (that may not be widely shared) about what technology is/should be (a collective normative understanding) and the corresponding expectations or in other words a consensus on the frame among actors. This frame is then translated into software language and entered into the body of the software, a process that I call "encoding". Drawing on social constructionist literature on technology, Joerges and Czarniawska (1998) conceptualize the creation of a collective normative understanding about technology and the conversion of this understanding into material medium (such as software language or text) as "technical inscription". Therefore, the creation of the shared consensus on the frame and the subsequent encoding can together be considered as technical inscription. The inscribed part of the software (called a module or sub-module) is put into testing and sometime trial use since the software has a modular structure. From a structurational viewpoint, the testing or the trial use (a form of practice) is an instantiation of the frames (that is structure) and the underlying norms encoded into the software through daily use, and thereby it is a process of an "enactment" (Giddens, 1979; 1984; Orlikowski, 2000) through practice[29]. This pattern is repeated in each column of table 5.2. Now, using the above-mentioned abstract labels, we can describe the pattern of the process as cognitive

[29] In enactment through practice, I exclude the discursive production of structures (and the meanings) and confine the enactment to practical reproduction of the structures embedded in the ERP software through its daily use.

sensemaking and framing--use of political strategies--technical inscription--enactment See figure 5.1: for the sake of convenience I have shown only three stages that repeats in other stages.

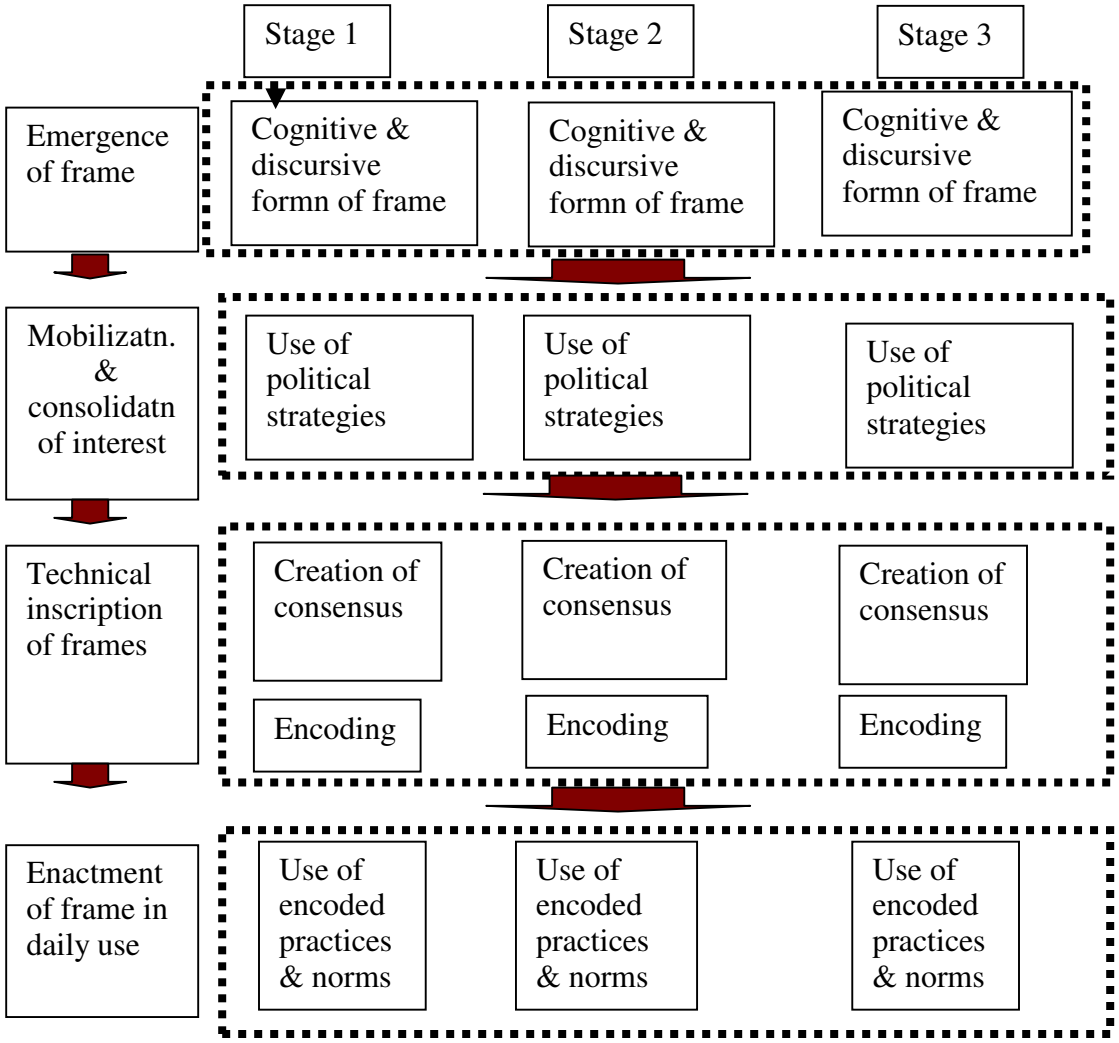

FIGURE 5.1: THE POLITICAL PROCESS OF CONSTRUCTING AN IS IN GOVINDIA

Now, I trace the connection between the vertical columns in figure 5.1, which will lead us into the relationship between the micro processes I mentioned above. In stage 1, the coercion of Itech, and Itech's realization (that was based on their current

experience of encoding) that meeting GovIndian employees' demand for significant customization would be more time consuming than expected motivated Itech to frame ERP as party customizable complex software. Thus, both the political strategies and the encoding in stage 1 led to frame formation in stage 2. The enactment of partially customized and automated practices and Itech engineers' sensegiving that a complete customization and automation would be impossible resulted in the employee sensemaking and the framing of ERP as a partially automating software (in stage 3). The employees increased non-cooperation and demand for automation led to the top management's discursive formation of their frame, ERP (mostly) an information integrator (in stage 4). In both stage 5 and stage 6 that occurred in parallel, it is the political action and the enactment that led to the emergence of frames. Thus, except in the case of the frame that the consultants formed discursively (ERP a partially customizable software), it was the political strategies and the enactment that led to the emergence of frames. This cycle was repeated (see figure 5.2).

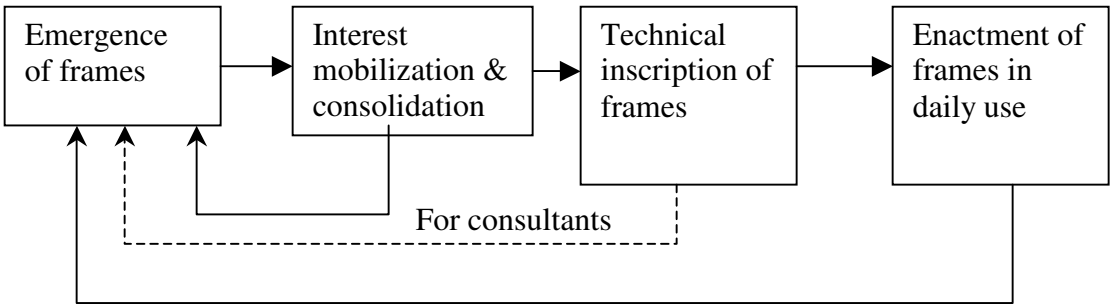

FIGURE 5.2: THE CYCLICAL POLITICAL MICRO PROCESS OF CONSTRUCTING AN IS IN GOVINDIA

In the following chapter, I take my findings and the processes I identified in this chapter to a radically different implementation context. The implementation context is

the implementation of a "branded ERP" software in a Western multinational organization that is culturally, politically, economically, and technologically different from GovIndia. In addition to the emergence of frames and political strategies, I pay more attention (than I did in this chapter) to technical inscription and enactment. Thus, I use the case study in the next chapter to reinforce my findings and the processes.

CHAPTER 6

INSCRIBING POLITICS INTO TECHNOLOGICAL ARTIFACTS AND THE POLITICS OF TECHNICAL INSCRIPTION: ERP IMPLEMENTATION IN WESTINDIA

This chapter presents the analysis of the implementation of ERP in WestIndia using negotiating technology frame as the analytic lens. As I did in the previous chapter, I present the episodes of implementation as changes in the aspects of technology frames that occurred through negotiating technology frames in an approximate chronological order. In this chapter, I expand as well as reinforce the arguments I made in the previous chapter. That is ERP implementation is a process of multiple actors shifting technology frames, which carry their sensemaking and views of the ERP technology, in their attempt to impose their respective frames over others as well as resist others' imposition, and the final ERP software becoming an outcome of this power play. The actors, while shifting the technology frames in order to gain predominance, use technology frames as an emergent discursive resource. They also resort to coercive institutional arrangements to exclude the resistance to their frames (or views). In such context, the seemingly shared consensus on technology frames could well be an outcome of such institutional coercion and exclusion. I introduced the notion of an institutional closure to denote such consensus. I also introduced the notion of technology non-affordance to explain a prominent way ERP consultants (or arguably the technical experts) exercise their expert power through sensegiving discourses that use technology frame as a discursive resource. In this chapter, I further expand these two concepts.

In the previous chapter, I had argued that ERP technology and the implementation

were a means to express employee resistance in other ways. I also presented a process model that could explain this political process of implementation. One of the processes I identified is technical inscription. Using the concept, I indicated how negotiators "inscribe"[30] their *political interests* into technological artifacts or machines such as computer (or software programs) affecting their functionality (for example employee's efforts to reduce visibility leading to less integration). Following Joerges and Czarniawska (1998), I call this process of inscribing as "technical inscription". Technical inscription consists of two processes: a) abstraction of the daily technical practices into shared technical norms--'legitimate collective expectations and prescriptions for actions' (Joerges & Czarniawska, 1998:373), for example, a shared consensus of ERP as an information integrator, and subsequent b) materialization of such technical norms, for example conversion of the technical norms into material medium such as written documents or texts that include software or machine languages (Joerges & Czarniawska, 1998: 370). In the previous chapter, we have seen the politics of technical inscription and instances of inscribing politics into the ERP software at a macro level (e.g., generalized across work practices and business functions). In this chapter, we will see the same process at both a macro and a micro level (e.g., the case of specific work practices within a business function). The objective of the examination of the politics of technical inscription at the two levels is to strengthen the overall arguments.

The use of the notion, technical inscription, not only helps me abstract further (from

[30] Inscription refers to the fact that an artifact embodies the developers' beliefs, social and economic relations, previous patterns of use, legal limits, and assumptions as to what the artifact is about (Akrich, 1992). The term inscription is used when designers formulate and shape technology in such a way as to lead and control users. Inscription, in particular, "technical inscription" (Joerges & Czarniawska, 1998) can also refer to the way technical artifacts embody patterns of use, including user programs of action. The term also encompasses the roles users and the system play (Monteiro, 2000). Since inscription can guide users to join or behave in a way that forces a definition of the form and function of the technology, many actors actively seek to inscribe their vision and interests into the artifact.

the concrete details in the previous chapter) but also is aesthetically more appealing since the technology I study is a software program--a textual body—that suits the notion of inscription in its literal sense. Moreover, the use of the concept, inscription, also suggests that in this chapter I take ERP software as a text, a conceptualization of technology that has characterized recent technology studies (e.g., Spicer, 2005). In short, in this chapter, considering ERP software as a textual canvass to inscribe *political interests* of the actors and the power relations among them, I will examine the politics involved in the technical inscription. As we did in the previous chapter, to investigate the political process of technical inscription effectively we need to understand the historical background of the implementation.

6.1 Historical background

WestIndia is the Indian manufacturing unit of a European private sector manufacturer of specialty transformers and associated accessories. The European multinational organization has four manufacturing units across the globe. It is one among the top five European transformer market leaders (Global Industry Analysts, October 2008). Unlike other manufacturing units in the European group, until the year 2000, WestIndia had been focusing mainly on Indian markets as opposed to international market. But, as evident from Table 6.1, the focused market is shifting from domestic (Indian) to international.

TABLE 6.1: SHIFT IN THE CUSTOMER BASE

Period	Proportion of products sold out in	
	Indian market	International market
1996-2000	80%	20%
2000-2005	60%	40%
2005-2008	50%	50%

This shift as well as the increased presence of global players in the domestic market, especially from China, also introduced WestIndia to more market competition, which the management assessed as moderate to high (Company document, 2007). WestIndia realized this shift in market not by proportionately reducing Indian customer base but by introducing more specialized products. Thus, during 1996-2006, the number of products leaped from 10 to 100. At the time of data collection, nearly 70% of the products were custom made as opposed to mass-produced.

The European business group took over WestIndia in January 2006 from another multinational European business group that founded WestIndia in 1996 as its sole manufacturing unit in India. When the company was founded, the European owners took it as a backup to its Sri Lankan manufacturing unit (Company document, 1996) that had troubles from the turbulent Sri Lankan politics—the fight between migrants from Tamil Nadu and Sri Lankan government. Taken as a back-up unit, it seems that the owners did not put much effort in WestIndia to mould its work processes and work culture compared to what they had done with the Sri Lankan unit. Thus, WestIndia had less 'founder's imprint' (Stinchcombe, 1965). Instead, the owners left the responsibility to develop the work processes to the Indian managers who were present in WestIndia. Although a European Managing Director (MD), one of the owners of the company, had been present in the company until January 2007, an Indian female business manager (55 years old[31]), formally the second person in the company (and one time the MD) who resigned in June 2007, took most of the strategic, business, and operational decisions. According to the employees, the manager adopted a "traditional

[31] The difference in age between the manager's age and the employee's age is important here since in the State's culture, which is high on power distance (Witteveen & Enserink, 2007), more aged persons are assumed to have more knowledge, and thus to be respected and obeyed by less aged persons.

approach" to business compared with the "better modern professional and scientific approach" that the new owner group seemed to be supporting. The employees used the term "traditional" to negatively characterize some aspects of the earlier management style. See some excerpts from my interviews:

She (the ex-Indian MD) was traditional…didn't like information sharing between depts.,..decision based on whims and fancies,..no formal plans..we never bothered about delays.." (Assistant Manager 1)

(H)ad no concern for cost..is traditional..to plan, you need a satellite view…they [the top management] didn't get the need for it. (Manager1)

The Manager1 was right: three years back the middle managers had proposed 'implementation of an integrated software or ERP' to 'modernize the business operations'. The earlier management did not take it up. But, the new (European) owners asked WestIndia to implement the ERP technology that WestIndia's counter part in Sri Lanka had already implemented in 1998. Unlike the ERP software that GovIndia implemented—an ERP software of a local vendor that came to be custom-developed for GovIndia, WestIndia was asked to implement a globally reputed off-the-shelf ERP product[32] from a leading ERP vendor[33] in international market (5th in market share at the time of implementation). WestIndia gave the implementation contract to the Sri Lankan consultant group, which implemented ERP in WestIndia's sister company in Sri Lanka. Subsequently, the implementation started in June 2007.

[32] Unlike GovIndian ERP that operated on a Linux platform with a multi-tier architecture and java as the software programming language, WestIndian ERP operated on Windows platform with .net as the software programming language and client-server model as the architecture. Both used Oracle 11i as the RDBMS.

[33] To protect privacy, I do not mention either the name of the vendor or the Sri Lankan consultant.

6.1 In the beginning…….

In the kick-off meeting (2 hour duration) where most of the staff members except supervisors were present, the consultants spent more time (almost an hour) on the methodology of implementation. In line with the usual project management approach, the contents were partly different stages of implementation with deadlines, milestones, and deliverables during each stage. WestIndia also constituted a project team with a 'project coordinator' as the leader of the team. To discuss the configuration and the customization of the software, nine formal meetings and a number of discussions followed. While the consultants were punctual in these meetings, most of the WestIndian employees came late. One consultant expressed his disappointment about the lack of employees' punctuality in these meetings: "Getting these guys in time is impossible!" As the project advanced, the consultants frequently pointed to the slippage in the schedule and the milestones, highlighting that unless the "users" complete their work and respond in time, the project would not finish in time. No one seemed to care much about it. One of the consultants commented to me publicly: "In Sri Lanka the company pressed us to finish in time. They do not have much slippage in whatever they do, be it customer delivery or meeting production due dates. Here, you see just the opposite. See we are pressing the company to finish in time. Didn't you see how frequently we have to remind them of the timeline? They neither worry about production delays nor missing committed delivery (to customer) date. They neither plan nor record. They have a 'leisurely do' culture here."

From a cultural perspective, it might look that the consultant was frustrated about the mismatch between his expectations of some 'temporal norms' (e.g., punctuality and adherence to schedules) (Ballard & Seibold, 2003) and the temporal norms that the

organizational members enacted. This may be true; a point I will revisit. But, in its effect, such negative comments that highlighted time delays and schedule slippages as a part of WestIndian culture was an appropriation (intentional or non-intentional) of an ERP related discourse that some WestIndia employees had mobilized before the implementation of the ERP software. The discourse reveals the technology frame, an image of ERP software in general (what ERP technology is, and in turn, what it should be for WestIndia), that WestIndia employees shared. In the following sections, using negotiating technology frame as the analytical lens, I present the five stages of the ERP implementation in WestIndia in a linear sequential manner (neglecting overlap for the sake of simplicity). This will highlight the technological frames that emerged during these periods, their interaction with the exercise of power and the political strategies, and the subsequent apparently shared consensus. I examine the political dynamics around the technology frames that various relevant social groups (Pinch & Bijker, 1987) (with fluid boundary) advanced. The relevant social groups I identified (see Figure 6.1) are: a) the Sri Lankan ERP consultants, b) middle managers (except purchase manager), c) engineers and officers, d) supervisors, and e) operators (line workers).

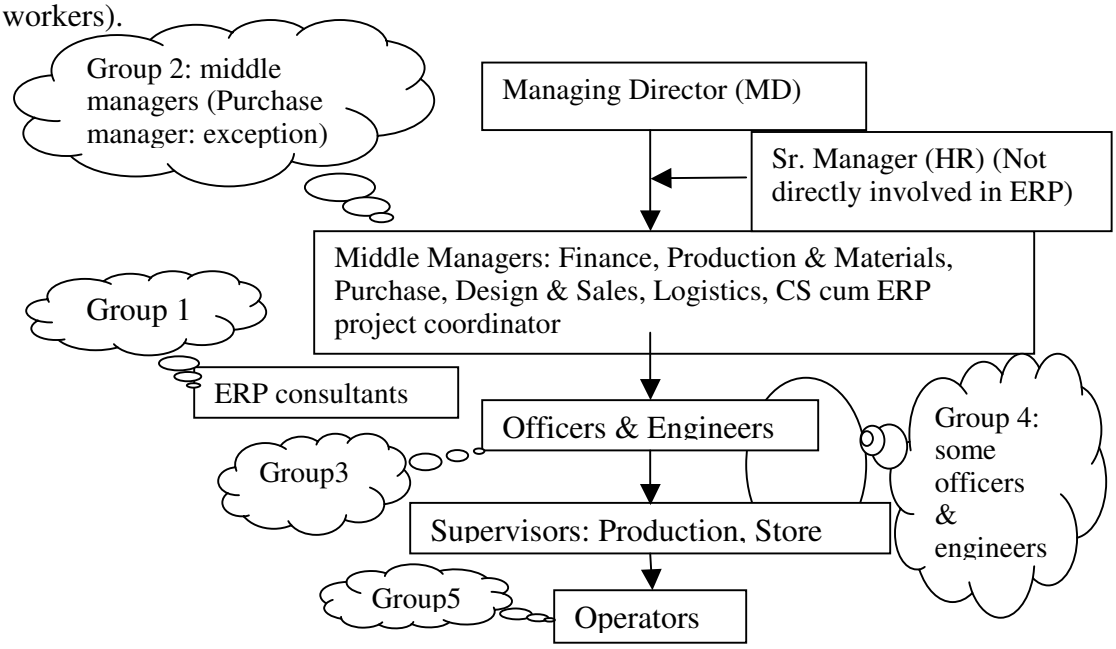

FIGURE 6.1: ORGANIZATIONAL CHART AND RELEVANT SOCIAL GROUPS

6.2 Stage 1: ERP a delay reducer

Before the implementation began, most of the managerial employees were aware of the ERP objectives. Thus, there was a shared understanding about the broad objectives of ERP implementation at this point in time. The analysis of interview data show that these objectives were: a) integration of the silos of information that resided in different departments and the accessibility of the consequently isolated information which was not shared across departments prior to ERP implementation, b) elimination of the mismatch between the pieces of information that different functional units used to pass on to the group owners, and c) delay reduction through automation of the routine tasks. Let me explain the mismatch first. Both material division and finance division used to send annual stock value data to the owners. Finance division calculated the stock value from purchase orders while materials division arrived at the stock value via physical stock verification. These two values were expected to match each other. But, usually they did not. Therefore, the group owners were upset about the difference in the stock value. WestIndian employees expected that the ERP would solve this problem.

Regarding the objective of delay reduction, many interviewees pointed out that until the take over, delay was not a very serious issue. Instead, as I mentioned in chapter four, delay was a normal part of WestIndian work culture. After the take over, the group owners had pointed out the issue of delay and delay had become a central concern for the top management as well as other managerial employees. The middle managers had mentioned the ERP objective of delay reduction in the managers' meeting. They expected that the task automation would lead to reduction in various kinds of delays that included delay in production such as that resulted in slippage of

the production due dates, delay in financial processing such as delay in making payments to the supplier, delay in material procurement such as not getting the material to the store in time, delay in material issue such as not getting the material from the store to the shopfloor in time, delay in completing the quality test, delay in product delivery to the customer.

As the ERP implementation began, out of the three initial objectives, the delay reduction received significantly more attention in the daily discourse of the employees. The management expressed their expectation that reducing delays would result in efficiency and time saving. Most of the interviewees including the middle managers interpreted ERP as a "modern solution to delays in production and data processing" that would provide WestIndia with a "systematic planning and scheduling". Accordingly, some of the main expected outcomes were "increase in over all efficiency" and "time saving". Gradually and more consistently, the managers started projecting ERP as a delay reducer, which became the predominant technology frame during this stage. For example, see part of the M.D.'s note to the WestIndian ERP team: " ..concern is to get rid of delays...learn from others..look at the software companies around..". Some managers and engineers projected the software engineers who surrounded them (recall the physical location of WestIndia in a local silicon valley) as admirable embodiments of professional (task) efficiency who, for example, meet tight project deadlines without any delay. See one manager's comment: "..objective is to be as (task) efficient as the folks around, prompt in meeting deadlines..*no more delays*..". To understand the implications of such pointers to the targeted model temporal behavior and professional identity (software engineer), we should situate the comments in the wider work environment and the ongoing discourses in India, particularly this state.

6.2.1 The discourse of esteemed software engineer

Over the years 1990-2004, India had seen a tremendous growth of IT industry (Dossani, 2006; NASSCOM data, 2004; 2005). Both scholarly and popular media had been projecting India as an emerging economic power, and at the centre of this discourse is a new professional identity: Globalized Indian software engineer—an identity that is celebrated as an icon of Indian success that combined Indian values with global values (Radhakrishnan, 2008). Both academic and popular media have projected such successes and the identity behind it as a role model for other industries (Radhakrishnan, 2008). The State government with its peculiar economic crisis (for details, see chapter 4) had identified IT as the 'engine of industrial growth' (State vision 2008, 2000). In turn, the globalized software engineer was seen as the prime mover of the new economy of the State. Scholars have noted that in India, software engineer has become an esteemed symbol of middle class people's professional success (Radhakrishnan, 2008; Upadhay, 2008; 2009). Given that the majority of the population of the State falls in the category of Indian middle class (Economic review, 2004: 20-28), it is very likely that the esteem and high status ascribed to software engineer was widespread among the society of the State. For example, it was usual in the matrimonial market[34] to mention software engineer as a desirable status for the person to get married. At some point in time, the media reported a public concern that it had become difficult for a non-software engineer to get a suitable person to marry (Malayala Manorama daily, March 16, 2004). The researcher himself had faced such challenges. See a comment from one of the WestIndian production engineers (during

[34] Unlike in may Western countries, in India, particularly in the State, the institutional arrangement for finding a person to marry is not through dating. Instead, the well-wishers (mostly parents) of the person who is desiring to marry advertise desirable features of the person they are looking for in matrimonial columns of daily news papers or the web sites of marriage bureaus—business institutions that brokerage marriages.

an interview) who had been recently on the matrimonial market:
"See George, all of them wanted a software engineer. This is the sixth time I am rejected…just fed up now…if you aren't a software engineer, it has become so difficult to get a girl"

6.2.2 Effect of the software engineer discourse: Identity formation

The effect of the ascription of high esteem and social status to software engineers was more significant for WestIndian employees since it was the only hardware firm operating in the 'software park', the local Silicon Valley. Software engineers had literally surrounded WestIndian employees. Even all the firms that were located on the same floor where WestIndia was located were reputed software firms. All these had significant impact on WestIndian employees. For example, during the interviews many managerial staff members commented on the disparity between the reception they got in the software park and that their software engineer colleagues got. Here is a typical comment (an excerpt from a manager's interview):

"There is a big issue of ego here. When those around us (referring to software engineers) come in coat and suit driving their cars, our poor engineer boys come in ordinary dress catching the crowded buses. They already have that hurt ego in their minds…. Even in the canteens (restaurants) our children and we too are treated like third-rate citizens…also put as at inferior positions vis-à-vis our friends (software engineers)"

As the series of data (including the comment) I presented above indicate, it is highly likely that WestIndian employees were sensitive to the identity formation process (Alvesson and Willmott, 2004; du Gay, 1996), the discourse around this desirable new identity. A step further, it is also probable that they were influenced by this identity formation discourse that the management reproduced in WestIndia, for example see the MD's and the managers' comment suggesting to emulate the efficient, professional software engineers. As mentioned during the interviews, while working in WestIndia,

the managers and assistant managers as well as some engineers had attempted to switch to software engineering profession since it had more professional status and salary. Many of them took software engineer as a coveted identity. See a typical comment: “We would love to be like the guys around—professional, (task) efficient, and up-to-date”. While I am writing this report, some of the engineers and supervisors left for software engineer positions. Interestingly, in the recent telephonic interview I had with an assistant manager, the manager remarked about having the ERP implemented, “now, at least we have become more professional .and (task) efficient..like the guys around us”. He was referring to the new identity they had developed by this time, an ERP enabled employee. I will revisit this identity formation, a central concern in the studies on politics of organizational change from a Foucauldian perspective (Alvesson & Deets, 2003). I will argue that some of the WestIndian employees expected that the ERP implementation would help them emulate the desirable software engineer identity by producing a similar identity, ERP enabled employee.

As we have seen in the WestIndian employees’ comments that I reproduced in a previous passage, a central theme was task efficiency, which was expected to come through reduction of delays and timely performance of activities. Previously, I had indicated that doing tasks in time (a temporal norm), in WestIndian employees’ opinion, had not been a part of their work culture. My analysis of the enactment of WestIndian work practices corroborated this point. But, adherence to schedules and doing tasks in time had now become important in WestIndia especially since the new owners valued it. At the same time, in the society around WestIndia, such new temporal norms which are qualified as “Western” by popular literature (e.g., Chopra, 1990; Khera, 2004) and academic literature (e.g., Lee, Hui, Tinsley, & Niu, 2006;

Sahay, 1998) had been increasingly highlighted as part of being professional and thereby desirable (as far some WestIndian employees are concerned). Next, I present this discourse around temporal norm in the wider society.

6.2.3. The temporal norm discourse

It seems during 1994-2004 there was a significant growth in the number of time management course and corporate training, and academic and professional literature that taught the trainees how to make detailed plans and do tasks in time bound manner, and thereby become more professional and efficient (NIEM data, 2006). Similarly, broadly in Indian media (daily news papers, TV shows, and films), and specifically in the media in the State where this study was conducted, there might be a significant increase in the focus on detailed planning and time bound actions as a part of becoming more professional and efficient (Kumar, 2003). Also, in the urban part of India there was a tremendous increase in the number of projects, especially short-term projects and outsourced projects with tight deadlines (NASSCOM data, 2004; 2005). These projects mostly follow typical project management style (of Western origin) with strictly followed milestones, deadlines, and detailed schedules and thus see task efficiency as primarily important (NASSCOM data, 2004; 2005). The spread of internet and its increased use, increase in the number of call centers, and outsourced IT projects (Batt, Doellgast, & Kwon, 2005; NASSCOM data, 2004; 2005) all put the working professionals of this State not only in close and continuous contact with the so-called Western notions of time but also presented such notions to them as part of a profession (Srinivasan, 2007). Given that WestIndia was embedded in such an environment, it was easier for both the managers as well as the consultants to appropriate such discourses irrespective of whether these actors were influenced and/or convinced by such discourses. As the earlier quotations show (p: 199), in

WestIndia, the managers along with the consultants pointed to the enactments of the so-called Western temporal norms in the wider environment as a model temporal behavior and software engineers as exemplars of such temporal behavior. In this context, the existing delay was framed as a significant problem that the ERP implementation would solve, and in turn, increase task efficiency of employees. We can see the use of this frame (ERP as a delay reducer and task efficiency increaser) in the discourses I present in the following paragraphs.

6.2.4 ERP a delay reducer and task efficiency increaser

Before implementing major modules, the production manager sent out an internal memo that read: '[T]his is our main objective of [ERP] implementation: to make..the dates we give to customers more reliable…Then, we should be able to *stick with them*. Now, whenever there is a change, there is re-scheduling..and that creates delay'. Many interviewees interpreted ERP as a solution to the pervasive delay problem. See an excerpt from a store staff member's interview: "Delay is the main issue.. that is due to material shortage and lagging in production…we have *unsystematic* and *unreliable* material planning and production planning ..we don't *stick* with them [the planned dates]..ERP solves these issues."

In addition to posing ERP as a delay reducer, the memo and the quote together suggest: a) that the lack of time boundedness might be resting on unreliable estimations, b) the positive expectation that by improving the reliability of the estimation ERP technology may improve time boundedness, and c) that the existing system/practices have negative attributes, like unsystematism. These three points were repeated many times. For example, below is a part of an interview with one of the managers that shows the belittling of the existing time orientations, and the manager's

expectation of "improving" some aspects of these orientations through ERP implementation:

" I told you earlier; ERP makes us perform better, and *forces* us to record data *timely* and *properly*. This increases *predictability*. This makes customer delivery dates *more accurate* and feasible, as it should be. This is very important in the case of WestIndia. Many customers see us as a *traditional* company that never does things *in time* and never keeps its promise. Always there will be delays. This is because we don't have *proper* records, *time sensitivity*, and that we are unable to trace. ERP *improves* these aspects. Now everyone is coming to realize this."

See an excerpt from assistant manager's (APM) interview:

" The main problem is delay. That is a frequent here. The main reason (for delay) is materials (shortage). Sitting in Production (department) you can say materials. Main issue is lagging. The approach to Indian customer is to say, "go and come tomorrow". In many places it is so. When it occurs many times, saying that it has been happening many times, they (Indian customers) put pressure on the Design and Sales (Design & Sales dept). Design comes and tells the AE (Assistant Engineers). The AE stops other orders and diverts the materials to the pressing order. Thus there is lag, lag of 3-4 days. In that way when there is lag in say 4 lines (production lines) suddenly there comes a requirement from 50-60 orders…that needs just one week. That (order) also gets lagged. This carries forward from one month to the following. Thus it goes on and on. We hope that ERP will take care of such delays."

This sensegiving discourse that employed a technology frame of ERP as a delay reducer had some effect. Other WestIndian employees (than managers) also interpreted ERP as a delay reducer that would increase efficiency. Below are some representative quotes that indicate this sensemaking of WestIndian employees (from my interviews):

Accountant: So the benefit is time saving and efficiency..by reducing delays and reduction in some workload. That is mainly automation of existing work.

Production engineer: In TIS (existing IS) info is limited to a section. To make it available to another department we have to manually copy it to that department. This also causes delays. In ERP, it's automatic. It connects all sections and departments. Thus it saves time and increases efficiency also.

Store supervisor: It reduces the time to fish out a piece of information. Thus increases the (task) efficiency. Fishing for information causes a lot of delays here.
Quality staff: ERP is for the reduction of production delays..through automation of tasks

Store staff member: ERP will reduce our cost and delay in processing, and saves time in processing and increase (task) efficiency.

Note the repeated point of delay reduction and resultant increase in task efficiency.

Appropriating this ongoing delay reducer discourse, the consultants framed time saving, and in turn task efficiency--two ERP benefits that they had projected--in terms of reduction in various delays. Below is an example:
"The main benefit is time saving..and increase in efficiency...reduces all delays..when you replace..traditional elements..with the ERP practices..industry accepted and so professional..to reduce delays..ERP helps with its built-in professional practices..that you cannot modify at your will.." (An ERP consultant in the first implementation meeting called project education).

From such sense giving discourse the employees directly involved in the implementation reinforced their sensemaking using the frame of ERP a delay reducer and task efficiency increaser. Further, they furthered their sensemaking by expanding this frame, taking ERP as a less modifiable delay reducer that has objective universally applicable standard professional practices. The adoption of the ERP standards was expected to result in delay reduction. See an excerpt from a manager's interview:
"That time I thought that our (meaning employees') input was insignificant, a bit of modification and nothing beyond that. It's like SAP [a reputed ERP] comes to the company and the company has to fall into the SAP line..That time when we came out from the meeting we thought that is the only way..[ERP] has universal standard practices..we have to just adopt it…and that leads to delay reduction"

But there were a few other managerial employees (directly involved in the

implementation) who contested such an image of the technology or the technological frame. A functional manager became the informal lead of that group. For example, see an excerpt from his interview:

"ERP..by itself cannot reduce delays..that is the consultants' fake claim..to dump their practices on us..need to accommodate our practices..they have to modify the software ..fine-tuning our procedures..will reduce delays".

The functional manager (PM) strongly expressed his opposition in the next meeting (3 hours long), which was the first meeting to discuss implementation of inventory module, accounts module, and purchase module. WestIndian employees labeled this meeting as 'PK (the functional manager's name) sir's fight with the consultants'. See a typical comment about this meeting:

APM (during an interview): It was actually a fight. PK sir suggested a lot of modifications including having four PO formats, which are different from their standards. He also told that Purchase division was not ready to change the existing practices just to match the standard practices. The consultants sternly told then it wouldn't work since changing the software significantly is impossible and that WestIndia itself would be in great trouble. For example, PK sir suggested…..Then N and S (the consultants) rejected it outright saying that it was unnecessary and was difficult to make in the ERP…they asked us to justify if we make any suggestion for change..and they repeated many times that they can do nothing that touches the core..the system won't allow it..all of us then thought we have to just yield to the system procedures… After a heated debate of about an hour, finally they (the consultants) agreed to change the standard code. Still, they did not change it fully..***perhaps there are some serious system constraints too.***.this is what many of us got from that meeting..

The sentence in bold indicates that in this meeting, as we have seen in the previous case study (GovIndia), the consultants were trying to create a perceived technology non-affordance. Below are some representative quotes from my interview that show the consultant's (C) attempt to create technology non-affordance perception and its effect on the users.

APM: Can we treat the assembled machines as three parts?
C: No; only as a single machine since there will be problem with depreciation. You know, this system is not so flexible. It poses a lot of constraints.

Store officer: When you link all these, there will be a lot of limitations (system limitations). That means we have to yield to the demands of the software to some great extent. This is the common approach, now.

Below are a few parts from purchase module discussions (PM: The functional manager, PC: Project Coordinator, C: Consultant):

PM (murmurs to me and a purchase staff): In Sri Lanka these guys (consultants) dumped their system on the company's head. The same ***trick they are playing here…the label is system limitations***. That won't go here.
PC: When you suggest modifications, you should ***keep in mind the limitations of ERP***. ***We cannot do anything with the limitations***.
……..
PC: We have to ***standardize*** it. That's ***the only way possible to go ahead***.
C: The issue is that the system is pretty much complex. We already have put a lot of efforts into it (modification), when we implemented it in Sri Lanka. So there ***are a lot of limitations built in by what went on earlier***. ***Also, the database and the language have its own limitations. No one can do anything with those things. To be realistic, we have to take these things into account or else nothing will move***.
……..
The argument between PM and consultants went on for half an hour. Finally, the consultants told:
C: I can give the due date field editable so that you vary the date description depending on the vendor. But it is always better to standardize. Otherwise, because ***this system works in a particular way, you only will have problems***. ***The links won't work***. For example, you won't be able to use the material planning utilities and the later ***patch ups will cost you more***. It's not that we are reluctant to modify, ***but the system doesn't permit.***

Gradually, PM, who opposed the adoption of ERP practices as well the consultant's attempt to create technology non-affordance came to be seen as a "traditional nuisance[35]" and was apparently excluded from some critical meetings. During the

[35] This usage was also relevant with respect to his age. He was about 62 years while the age of the consultants and all other employees involved in the implementation ranged between 26-35.

implementation of the modules that occurred during this stage, the standard ERP practices were adopted without significant[36] modifications in the standard modules. Such standard practices when enacted were assumed to result in reduction of delays. The employees started trial using the modules, enacting the encoded standard practices. PM's and others' opposing views to interpreting ERP as an automatic delay reducer as well as the move to implement other modules such as materials management and production management triggered further discourses about how ERP would/would not reduce delays. Meanwhile, the consultants started highlighting WestIndia's "lack of records", "late recording", and "insensitiveness to time" in negative terms, thereby making them more salient. The interview data showed that most of the employees also felt that "the late recording", and "lack of time sensitivity" of the "existing culture in WestIndia" should be changed, which in turn, would help them become more professional. The negative characterizations of the aspects of time underlying the existing practices looked probably stronger as they were seen in the light of, and sometimes grouped under, existing "traditional approach", an approach that the employees themselves characterized negatively, for example, as unsystematic. This discourse suggested that the ERP's standard practices with its temporal norms were more desirable than the local practices with its local temporal norms since adoption of ERP's standard practices would lead to delay reduction, and in turn, increase in task efficiency, a hallmark of the desirable identity--software engineer. This discourse was overlapped by the discourse on how ERP would/would not help reduce delays, and in turn increase task efficiency, that generated a different political

[36] In ERP parlance, the changes in the appearance without changing the underlying database or in other words changes in the front end is considered not as a significant change. If there is a change in the database or the mathematical algorithms underlying the tables, such a change is considered significant.

dynamics and changes in delay reducer technology frame. Therefore, I consider it as the next stage: stage2.

6.3 Stage 2: ERP a disciplining agent-enabling face

In this stage, there occurred an expansion of the earlier sense making that delay reduction occurs simply through the adoption of ERP's standard practices and the replacement of the existing traditional practices. In addition, now the employees started realizing that to materialize the delay reduction through ERP technology they (employees) need to enact the standard ERP practices and, that the temporal norms and other such work norms that they need to enact are quite different from the temporal norms and other such work norms they had been enacting so far. As I have noted previously, employees claimed that the trial use and the discussions with the consultants as well as colleagues triggered this expanded sensemaking. For example, below is a manager's (DSM) reflection on his and his subordinates' trial use of the Sales module:

I: What was your picture just before the ERP implementation started, that is before middle of June?
DSM: If you press a button you get the over all picture. This was my ideas until now…you don't have much role…just the software would resolve our issues..[earlier, during the interview the manager had mentioned delay as one of the major issues]
I: Now?
DSM: Now it got changed after the implementation of the Sales modules. I see some other issues (silence)
I: Means?
DSM: That means are we utilizing the opportunities, infrastructure or utilities that we already have? ERP will only show us the things. We ourselves have to implement, right? I mean we need to carry out what the ERP suggests. I doubt that there is a gap between ERP's suggestions and our implementation. I doubt that it will occur repeatedly.
I: Can you please explain a bit more?
DSM: The machine (ERP) will give the output of the machine. The planning needed for daily activities, we ourselves have to do. This means, on the basis of the ERP output we have to carry out the tasks, we have to implement the plans (ERP plans). If

there is a gap between what ERP suggests and what we implement, it will *adversely affect the performance*. We have been executing our tasks differently for a long time..for example, we didn't train ourselves to do tasks in time..or do it systematically..we didn't have such a system here..now we are bound to do *systematically in time*.

See another similar message from an assistant manager's (APM) interview:
APM: Before starting the implementation, this was the image: anything you need, will be there in the system. Anything you need, you can get from the system let it be regarding production or any other such function. From my seat itself I can get any information I need. This was the idea, the concept.
I: What is the current idea?
APM: Now, this is the image: if it is not implemented properly, it will be an utter failure. See there is a big difference between what we have been doing and what ERP has. I mean it all depends on how well we use the ERP and to what extent one can input data and extract it. I mean it has a lot of human factors. Unlike we had been doing so far, we have to do a lot of detailed planning, and adhere to the schedule, etc. ERP is a standard tool. But it (the success) depends on how well we use it and manipulate it. So we need to put the ERP's suggestions into practice. That only can give us benefits like say *delay reduction and work efficiency*. Earlier the concept was that if we have ERP, we have everything. It will do everything including all kinds of planning. We can just sit and watch.

Below is still another interview excerpt (from another manager's (PM) interview):
PM: In ERP it cannot be done. Now..we'll be more time-bound... It's not possible that different (production) lines take different tracks or function differently.
I: Can you please explain it?
PM: ..(In the existing local practices) there are start dates and finish dates..flexible..guidelines..you could change them. Now, you can't... It is hourly based..and make us *time bound..more efficient..and reduces delays* [I: uh..]..
PM: ..(In the existing practice) We don't go for line production…
I: What do you mean by line production?
PM: That means start with line 1 and then follow the sequential steps keeping the same line..Now..it's (in ERP) sequential..have to adhere to it (the sequence)..

Here, managers point out that the ERP's work norms such as temporal norms (e.g., time boundedness, detailed planning, and schedule adherence) (Balrad & Seibbold, 2004) and spatial norms (e.g., adherence to activity sequence) that are enacted or to be enacted are different from WestIndia's existing local work norms. More importantly,

they suggest that the adoption of ERP norms is beneficial in the sense it leads to delay reduction, efficiency increase and systematic approach. The essence of this discourse is not merely a repetition that the ERP may be interpreted as a delay reducer and an efficiency increaser but this discourse also tries to generate a new sense (i.e., sensegiving) that to make that technology frame working, one should favor ERP practices with the underlying work norms over the local work practices with its underlying work norms. Thus, this sensegiving discourse was in alignment with the consultant's discourse on the necessity to accept ERP standards and its benefit over the local practices including its underlying temporal norms. The reproduction of the consultant's attempts (this time by the employees also) to qualify the temporal and spatial norms of the ERP practices as positive and simultaneously that of existing practices as negative made this sensegiving discourse stronger. Here is an excerpt from a WestIndian ERP project team member's interview (TM):

TM: [A]lso, we have many *unsystematic traditional* practices. We can't get these things into a system….
I: What do you mean by unsystematic?
TM: See, ERP has a *sequential way* of doing. That is a very *systematic*, *disciplined*, and *professional* way—step by step. If there is nothing like that [sequential way], it is unsystematic, undisciplined. They are not *normal*. See we usually do here many things at a time with no plan of what should be done at what time. This is the problem.
I: Sorry; I'm still not clear about the meaning of unsystematic and undisciplined. Please elaborate.
TM: (appeared deeply thinking) If it has a logic, it's normal and systematic. We just have only a broad plan. That is itself changeable. We have some sort of *no-logic* in the way we do things or we don't know our logic or maybe we don't even know whether we have a logic at all. However, *ERP has a clear logic*. So it's normal."

The points that were vague in the managers' interview—the negative characterization of local work norms (in TM's interview it is temporal norms) vis-à-vis the positive characterization of ERP's work norms—is clearer in TM's interview. The temporal norms include delay, (lack of detailed) schedules, (lack of) precision or time

boundedness (Ballrad & Seibold, 2003). Gradually, the ERP's global or so-called Western spatial-temporal norms and their enactment (e.g. time bound data entry, creating detailed work plans, and schedule adherence: temporal norms; sequence adherence: spatial norm) became the normal, logical, and professional way while the local spatial-temporal norms and their enactment were taken as non-logical unsystematic. Many times, the consultants fuelled such discourses. See part of a discussion between WestIndian ERP Project Coordinator (PC) and the consultant (C) during testing of sales module:

PC: Is there any way for raising the invoice not going through so many steps (seemingly irritated)?
C: Hey, [PC], now you already know that if you want a *better system* [means ERP], you have to follow the sequence strictly…no jumping..All these data are required to link..(different modules). So the concept is to follow the sequence strictly for your good or you have to do it manually. Do you want to go back to .. your *jumping traditional way*? (scornful voice and facial expression)

As I noted previously, here again, there is the juxtaposition of negatively characterized and categorized (as "traditional" approach) local temporal norm and its enactment with the positively characterized ERP's global temporal norm and its expected enactment. This strategy of positive-negative characterization, juxtaposition, and categorization formed a pattern and made the sensegiving discourse predominant. Sometimes, to comment on specific employee behavior, the consultants drew upon the discourses in the wider society that projected the global so-called Western temporal norms and the people who epitomized it favorably:

C1: Do you guys read Khera [popular Indian author on time management, success, and task efficiency]? He taught us to make better daily plans..this increased our efficiency; why are you guys like this?
……..
C2: "Recently, I read an Indian magazine.. the success of Indian business people..the essential elements to succeed in business or life is to plan and do in time...Did any of

you read it? You should"
PC: (laughs) That is why we have your [ERP]..to give us good plans, and to make us prompt, right?"

Note the reproduction of the taken-for-granted favorableness of ERP's global notions or so-called western notions (and its proponents such as the consultants, vendors and so on) over the local notions to mobilize the active consent of the locals, a group of WestIndian employees. The use of such hegemonic sensegiving discourses (Foucault, 2002) mobilized around the technology frame of delay reducer and efficiency increaser highlighted that the "fault" (e.g. causes of delays) lies not only with the local system of practices (as projected in stage 1) but also with the actors' behavior—their enactments of the practices. Therefore, beyond the mere adoption of ERP's standard practices, it was necessary to act (or behave) in a new way and habituate the new set of behaviors through enacting the ERP norms without any deviation. In this context, some employees interpreted ERP as bringing out a positive change in their behavior while some others interpreted it as rendering the employees more visible to peers and superiors, and thereby increasing employee monitorability. Therefore, I used Foucault's (1977) notion of discipline to label (or code in grounded theory analysis) this theme and to interpret the technology frames that emerged around this theme during this stage and the next stage. Also, note that this disciplinary formation ties it back to identity formation. Following Foucault (1977) I use discipline[37] to denote both its creative aspect that shapes the desired individuality or subjectivity (for example, ERP enabled employee equivalent to a professional task efficient software

[37] I chose the label discipline also because this is the term WestIndian employees used (in vivo code), which has deep meaning in the local culture of the State. For example, in the local culture discipline means that the disciplining agent (e.g. a parent or a teacher) has the legitimate right to punish. Such punishment is taken for granted to be for the good of the disciplined and the disciplined has no right to question such punitive action. A typical example frequently used in the local culture is a teacher 'disciplining' a student or parent/elders 'disciplining' the children/younger ones.

engineer—a desirable identity for WestIndian employees) and its constraining aspect that renders one to a panoptic surveillance (which we will see in Stage 3).

By this time, the consultants, the managers, and some other staff members began suggesting that ERP had the capability to bring out the positively shaping discipline. See a representative comment during an interview:

As I told you earlier, ERP *forces* us to record data *timely* and *properly*..improves our performance…the delays occur because we don't keep *proper* records and don't have time *sensitivity*..we need more ***discipline***... ERP *helps here*..***disciplining*** us and making us more *professional* (DSM: a manager).

Again an excerpt from DSM's interview:
DSM: Since the whole lifecycle is captured in the system, one can easily identify who is lagging behind others. I think people will start working more out of fear. (of monitorability). People will become more responsible and more ***disciplined***. …This may help ***increase the personal efficiency***. But, I don't know whether it is going to be positively or negatively affecting Toroid because people like me have been working here in a passive atmosphere for past 10 years. From that a quick shift to an active atmosphere-*I don't know whether it is going to be positive or negative*.
I: What do you mean by passive and active?
DSM: That means earlier performance and *efficiency* were not issues for us. Similarly, we were not sensitive to delay in customer delivery. Now, when there is increased *accountability*, the performance and the *efficiency* become issues, timely delivery to customer and in that the concern for number of product delivered..I mean such focus on *efficiency and time will force us to be always active and disciplined*-we will be made *more time concerned and efficiency concerned*. As a result, our individual *efficiency and our discipline also will increase*..we'll become *more professional..like the folks around* us.

Recall that during the delay reducer discourse (and even before) in the previous stage, the management had pointed to software engineers as the exemplar of (task) efficient professionals. Therefore, perhaps, the message here is that ERP is disciplining the users into a new desirable identity that is equivalent to software engineers. Although the same manager, along with other managers, had been projecting the transformation

into a more professional like the software engineers, at the same time he is also skeptical that costs involved in that transformation may outweigh the result, the achievement of the desirable identity. We will revisit this point. Also, as in the case of delay reducer discourse, in the above discourses also we can see how the manager-consultant coalition used technology frame as a 'sensegiving strategic' (Spicer, 2005) device. Perhaps, as a consequence, gradually, the employees other than managers also came to interpret ERP as a disciplining agent (not merely a tool). Here, agent means one with a capability to transform, which in turn, indicates attribution of a causal agency (capability to cause a change) to ERP technology. This point is evident in the above comments: a perception that ERP forces employees to behave in a time bound manner transforming them into more professional.

As ERP implementation continued, "disciplining" and "systmatism" were added as expected outcomes of ERP implementation. Here is a typical expectation: "..one of the desired outcomes is disciplining our work. We used to *violate* or jump over sequential steps. ERP will *discipline* us to work correctly according to the procedure." (Design engineer).

Notice the italicized words violate and discipline, which indicated a deviation from the normal, the "normal" "right" way being the sequential way—the ERP way--as we have seen in the interview with the ERP project team member (TM). Below, I give a few more representative quotes to show how the sensegiving discourse mobilized using the technology frame, ERP as a disciplining agent, became the sensemaking of other WestIndian employees:

Assistant manager (in an interview): It (ERP) won't allow you to issue materials from the latest lot. So you are forced to issue the material from the earlier slot…this is part

of a good *discipline*..strictly following FIFO[38]

Sales engineer (SE): (t)he material forecasting we do is manual. When ERP comes that will become more *systematic and disciplined*…
I: Systematic and disciplined..means?
SE: Systematic means bring to a single platform in an orderly manner..disciplined means keeping that order and doing things properly in time.

(ERP) Project coordinator (in a meeting): Similarly, bettering the production planning, *delays can be avoided*. In that way we can get an order and become more *systematic and professional*…the system will force us to a *discipline*.

Engineer (during a casual conversation in the corridor between an account and an engineer): Now if you are not doing the job the way system tells you and within the time prescribed by the system, the system will catch you. You get a *discipline* that we lack here..both with respect to time and adherence to procedures. That is the good part of it.

Assistant engineer (in an interview): Here, we have a lot of flexibilities. When ERP is implemented fully such *flexibilities* will vanish. It *should vanish*. That is one of the aims of ERP…thus, we become more *systematic and disciplined*…for example (of flexibility), now if we plan to deliver for December 1, even if deliver say by December 4 or 5 that is okay-there is such a generally accepted concept in this company. That goes on and on. Since it is not affecting the running of the company or anything else, it is going on.

Overtime, the new technology frame that interpreted ERP as a disciplining agent was stabilized (Pinch & Bijker, 1987). In turn, the ERP's global practices with its global spatial-temporal norms were kept intact in the modules that were being implemented during this period. While using these modules and thus enacting the embedded ERP practices, the employees felt that they were ***forced by the system*** to adhere to the prescribed sequence, perform tasks in time, and to see time as a scarce resource. See an excerpt from a Sales Engineer's interview:

[38] FIFO: First in First Our is an material stock inventory policy. It means the material that is received first (in the order of receiving) into the stock should be issued first.

Now, it [time] has become some thing that runs out. After using (ERP), that feeling has become much stronger..we have to finish in time, and more tasks in short time. It is like the system forcing us to do so—may be a good disciplining…more professional and more efficient.

Moreover, many employees felt that their "traditional ways" of executing tasks, such as the "sequence jumping", is "not a good" practice and "should be avoided", and that it is better to follow the "more scientific", "professional" and "systematic" way such as adherence to sequences and schedules, and time bound actions. At this point in time, keeping the ERP's sequential way of doing intact, in the software, it was made impossible for "users" to "violate" any sequence. We should note here that it is possible to provide a user intervention through which users can override the sequence adherence and schedule adherence depending on their access rights. There was such a suggestion but it was neglected since it would drive WestIndia backward. As one purchase officer expressed, although the practices such as sequence jumping had no written rule or a visible pattern of occurrence, the employees knew the "rule of the game" (Haugaard, 1997). Now, the ERP was bringing a new rule to the game: a new task execution discipline—a new order in performing task (e.g., adherence to sequence), a new temporal discipline, and a new cost related discipline (e.g. more focus on profit, and more cost consciousness). Consider the task execution discipline, for example, adherence to the predefined sequence of activities. Such sequence fixing, when it is ordering the activities carried out, has spatial-temporal aspects (Schriber & Gutek, 198; Zerubavel, 1981). The activity gets fixed in space. By fixing the position, the possible pattern of activity occurrence in time (for example, at any time A will always follow B) is also fixed and made easily predictable and controllable. Put differently, time is bound (time boundedness) and made controllable through binding space (Sahay, 1998).

Out of the three disciplines, the most frequently appeared in the daily discourse was temporal discipline. Therefore, I consider the temporal discipline in more detail. For the sake of simplicity, let us focus on the two most frequently mentioned (in the daily discourse) temporal norms[39], time precision (e.g., entering data in time) and adherence to schedule, two aspects of time boundedness. That is time boundedness in data recording, and time boundedness in task execution-with respect to starting and finishing a task, that is scheduled adherence. First, we consider the time boundedness with regard to recording the data (time precision). This means, in contrast to the earlier practice of recording data at their convenient time, now many employees felt that they were forced by the system to record the data at the moment the data are produced. In an interview, the ERP project coordinator (PC) described the situation as follows:

PC: Change in rhythm means..eh..now, you can't complete the following activity without completing the previous activity. Earlier [in existing system], we could do all such things in all different ways. See, without completing production and recording it [now] you can't raise invoice. Then, if there is a delay in recording completion of production, that will affect invoice raising [In the exiting system employees used to take invoice when production nears the completion].
I: uh..uh..
PC: Means our old rhythm will be broken. There is no point in setting process right. This [the new rhythm] should evolve. When it becomes a pressure that you can't record the sale, it gets escalated and it becomes a serious issue, naturally production will fall in line. The style will change to record the production in time—they will be *forced* to become so, more disciplined and efficient. See a system has its own self-rectification. This [the forcing] will be done as a part of it… Of course there will be conflicts. Then, naturally we'll find a new rhythm….Then, the case of filled invoice: it is posted in logistics. They do it purely for custom requirements so it is done only weekly. Now, that is not sufficient. Invoice can be done only after recording. No delay is possible. Then won't it break their rhythm? Then, they themselves [will] find a rhythm.... Now, unless you enter the GRN (Goods Receiving Note) timely, you can't issue materials. There also it will generate a new rhythm. Everyone has to find this new rhythm. They will be *compelled* to find it…there comes a beautiful discipline.

[39] Also, I think these two norms had maximum impact on the work life of organizational members. This point will become clearer as we continue with this analysis.

Notice two points in this discipline discourse. First, from the multiple evidence we have above, it seems that the manager-consultant coalition's attempt to discursively shape other employees' technology frame through sensegiving discourses was effective to the extent the other employees used the technology frame, disciplining agent, as a cognitive device to make sense of the ERP technology. Second, in this process, the role of managers in structuring the employee behavior (through disciplining) was subtly transferred and attributed to the ERP technology. In the following passages I analyze these two effects, starting with the latter one.

Scholars have consistently observed (and debated) the transfer of the labor control from bureaucratic structure to technology (Edwards, 1979; Knights & Willmott, 1990; Sewell, 1998; Thompson, 2003). Beyond the transfer of the labor control, the debate also raises a question of responsibility for control or who is actually controlling. Note that there is a frequent appearance of an attribution of a causal agency, which is the capability to cause transformation, to the ERP technology through out the WestIndian discourse of discipline. For example, in the above-reproduced interview excerpt, the PC defines the change in the rhythm as a force by the system. The attribution of this causal agency was embedded in the discipline discourse that the consultant-manager coalition initiated. Thus, the attribution of causal agency was a discursive political construction. Some students of sociology of technology (e.g., Callon, 1986; Latour, 1992) have been vociferously arguing for considering technology (or non-humans) in its own right as equivalent to humans (humans and non-humans together called actants) with respect to cognitive and causal agencies. This argument has gained increased currency in recent technology implementation literature (Wagner, 2004). At the same time, critiques have observed the change in perspective of these sociologists

of technology from a social construction perspective to a realist perspective while ascribing agency status to technology. Marxist scholars who adopt a realist approach have criticized these works of sociology students for their neglect of the mediational role of technology (e.g., Mutch, 2002; Reed, 1997; Volkoff, et al., 2007). Based on my earlier observation, I suggest that one of the ways to address these criticisms is to examine the socio-political construction of agency attribution.

Through developing the discourse of causal agency attribution (to technology) and reproducing that discourse, the managers' role and responsibility in making the choice of practices, and in turn, bringing out the employee discipline by means of technological force was written off to the background. Instead, now, ERP became responsible for the act of instilling discipline through force into the employees. The excerpt from project coordinator's interview is a typical example of such discourse that reflected the public discourse that was going on in WestIndia. As it occurred in the case of WestIndia, in certain context, the discourse of holding technology responsible or accountable may be used to produce ideological hegemony (Lukes, 1974). That is to discursively mask the taken-for-granted relations of managerial domination and to mobilize the active consent of the dominant reproducing the hegemonic discourse. Given the employee (non-managers) expressions that favor ERP's global practices (over local practices) and their reproduction of the discourse of the agency attribution, it is tempting to argue that the manager-consultant discourse was hegemonic. But, since I cannot eliminate the confounding role of coercion in producing the indicators of the consent, I do not argue so. However, the attempt to produce hegemony is ethically significant since it tries to reproduce and reinforce the taken-for-granted relations of dominations and the negotiators of technology were mostly managers. Also, one class of users (e.g. supervisory staff) was totally excluded

from the negotiation by fiat. But, it was equally these users' task related behavior (also) that the 'ERP was going to discipline' or structure, while they had no formal voice in this decision-making process. Later, we will see the muting of this class of users' voice that tried to informally influence the decision-making process of technology modification. Thus, as far as WestIndia is concerned, to a significant extent, the managers made the choice of practices to be encoded (So far the choice has been ERP's disciplining practices over WestIndia's non-disciplining local practices). Moreover, the managers were well aware of the potential drawback (in managers' own evaluation) of their choice to adopt ERP work norms and practices. For example, see some interview excerpts from the managers' interview:

PM (a manager), about the decision to adopt ERP's sequence adherence: In ERP we don't give such an option (clustering) to the supervisor. In planning itself we decided that job should go sequentially; not possible to club. Operators and the supervisors, those who work at the bottom most, know that clustering would be better. Clustering would bring better utilization. Also, in line-wise operation the discretion and importance of the supervisors and operators will be reduced…they may lose the vigor of their work.

DSM (another manager) about time boundedness: "I think people will start working more out of fear. People will become more responsible and more disciplined. This will help increase the personal efficiency. But, I don't know whether it is going to be positively or negatively affecting WestIndia because all people including me have been working here in a passive atmosphere for past 10 years. From that, a quick shift to an active atmosphere-I don't know whether it is going to be positive or negative…I can see that the monotony and the work stress of supervisors and operators increasing."

At the same time, some of the employees who reproduced the discipline discourse interpreted it as reducing the existing valuable freedom. Below is a representative example, an excerpt from an interview with a member of the Finance department: "One *advantage* of ERP is that if we don't do the things we should do today, tomorrow it will cause a lot of trouble to a lot of people at a lot of places. In the old system if I don't do my job a day nobody will come to know….Say I got a PO

[Purchase Order] today. I didn't feed [entering the price details into the existing Finance package] it today; rather I'll feed it tomorrow. What'll happen? Nothing! If that guy is not paid then only questions will come from the Purchase. Till then 'am safe. I have the freedom to decide when to enter. We have a lot of *freedom that we value*. But, once ERP comes (to full use) that *freedom is gone*. Tomorrow the other person has to know that this data is fed. He'll look for that."

Thus, some of the employees assessed time boundedness—a new temporal discipline--as advantageous, though it may cut into an existing valuable freedom. Occasionally, time boundedness also became the only way to increase performance. See a comment during the inventory module testing: "Who wouldn't know that the only way [to better the performance] is to do it [the tasks] in time?". We should note that for many staff (except design and production staff) members from Finance, Sales, Purchase, and Store, data entry was the main content of their work. Thus, for them it was not only the data recording that became time-bound but also the execution of their actual tasks. In other words there was a significant change in the way these employees perform their tasks. This change had potential negative (in employees' evaluation) impact on their work life such as increase in work stress, increased monitorability, and loss of discretion over how their work is to be done. As the interview data showed many employees were aware of such negative impacts, although they did not express it publicly. Still, many employees did not question the "time boundedness" in data recording that the system "forced" upon them. Instead, as we have seen in the above interview excerpt, many employees who bore or anticipated to bear the "negative" impact interpreted such disciplining as advantageous or desirable. Why?

I consider three plausible explanations. First, one might think that these employees were not aware of the potential "negative" impact on their work life and/or its significance. Nearly 50% of the employees who I interviewed from this group (6 engineers/officers out of 14 and 4 supervisors out of 9: total 10 out of 23) had

expressed their awareness about the potential "negative" impact. We already saw an example previously. Below are a few more interview excerpts:

Production supervisor: MD can come to know about all activities and can even monitor directly..will affect our performance negatively…will loss our discretion and the vigor of our job

Store officer: Now, if I don't enter it in time, it will raise a red flag somewhere…and all who have the access can see it..work like a machine..

Production engineer: In the case of ERP, when FG also is entered into the ERP, anyone from anywhere can come to know how much FG we have in the Store..monitoring could stretch you out.

Accounts officer: In the existing (system) no one will come to know. We can do it later ourselves.. In ERP, if you enter at one place it will automatically reaches all other places…too much stress..how is it good?

We will see similar quotes in the description of the next stage. Given the daily interaction between these employees, it is probable that more employees were aware of the negative impact. Therefore, the lack of awareness explanation does not hold good.

Another plausible explanation is that given the employees were aware of the benefits and costs in their evaluation the benefits they considered might have outweighed the costs. Although they were aware that it cuts into their freedom and that the expected enactment (and the embodied temporal norms) were different from their habituated practices (and the embodied temporal norms), they were ready to be forced by the system to change, as it was the way to become more "professional" and "efficient" as opposed to the "traditional" way. This point is evident in the discourse I reproduced in the earlier paragraphs.

Thus, these employees took the sequence fixing and time boundedness as one form of desirable disciplining. They were optimistic that the effect would be an increase in their efficiency as well as the company's efficiency. Given the efficiency discourses in the wider society and its continuous appropriation in WestIndia (that we have seen in stage 1 and in stage 2), this is not surprising. More importantly, as I mentioned when I indicated an identity forming effect of the discourse (see pp: 181-182), such increase in efficiency through the new discipline was also related to the increased professionalism. Recall that the employees as well as the discourses in the wider society considered the increased professionalism as a hallmark of software engineers. Therefore, I suspect that in the assessment of these employees the desire to have the features of the desirable identity (such as high task efficiency, frequent use of software) outweighed the cost. This partly motivated the employees who genuinely believed that the new discipline was advantageous irrespective of its costs. Thus, it seems that in the case of some non-managerial employees (who belonged to group 3 and group 4) their preferences (for example, of work norms, practices, work style) were formed discursively. [40]

However, it is difficult to ascertain whether all these employees a) were open in the expression of their assessment or were just pretending, and b) genuinely believed that the new discipline was enabling or were these employees simply pretending. I do not consider the conviction as zero-sum or a binary (0-1) variable. I suspect that there were employees who were partly convinced or less significantly convinced but still

[40] Given that a) the managers in their discourses underplayed the negative (in their own assessment) impact and selectively highlighted the outcome (in managers' own assessment) they expected (of employees) as positive, b) in some subordinates' assessment such expected outcome outweighed the negative impact (which shows these employees' internalization of managers' values), it is an exercise of ideological hegemony (Lukes, 1974).

reproduced the discourse of enabling discipline. I suspect that, even in my interviews, it was the perceived threat or coercion that drive these employees' consensus (that manifested as the reproduction of discipline discourse) on the technology frame of ERP as an enabling disciplinary agent. For example, see some representative interview excerpts:

From a casual conversation with an accounts officer (AO):
AO: In the existing (system) no one will come to know. We do it later ourselves..at our convenience…In ERP, if you enter at one place it will automatically reaches all other places. If we don't do things in time or commit a mistake won't we be caught immediately? Please tell me…(AO goes on)
I: What are the positive and negative sides you see in that?
AO: Positive are these things…like I told you the ***efficiency increase and the systematic discipline.. But, I don't think it will happen in our case…Here, but, it is wiser..to just join the folks***.. Negative means..see if we don't enter (in time), all things will go wrong and ***we will be in trouble***. Similarly, since editing is not possible, if say instead of 1 piece, if I enter 2, it will create troubles in so many places..can't make errors....
I: Isn't it the same with existing IS too? If you commit mistakes
AO: (intervenes) there we can edit ourselves. No one will come to know. But in this (ERP), we won't be given the authorization to edit…everyone can see what happens…..
…….
I: By implementing ERP, any other change?
AO: I think when ERP comes (to full use), headcount reduction will occur. So you have to show up your efficiency. I think that ***there will be some terminations*** (again tensed voice and face). ***Now I feed and compile. That work is no more required. System will take care of that job***. Similarly in Purchase..that way in so many places..

AO gives indications that he did not interpret the ERP discipline as resulting in efficiency increase but still he 'joins the folks' to reproduce the enabling disciplining frame probably because he foresaw some harmful consequences (including termination) had he not done so. Also, he did not see the efficiency resulting from ERP's discipline. Instead, he saw the efficiency increase at least in these employees' case as a result of 'showing up' to avoid the possible termination.

Below is another interview excerpt from a production supervisor's (J) interview that indicates that the reproduction of the discipline discourse might be a result of the combination of conviction (due to the discursive formation) and coercion.

J: I think if we have to just execute according to the ERP plans, we may be more time pressed. One way, ***it is good since we will become more time-bound***. Now, there are no such things. ***There are those kinds of unsystematism and inefficiencies***. ***But, we can't become so hard on the production targets and also so time bound, I think***. ***It will improve efficiency and will make us more professional. That is a welcome part. But at the same time such time compulsion also will generate quality problems.*** I think we may have to enter a lot of data and then if we have to finish the data (entry) in time, we may have to focus more on the data (entry) completion than on the line (production). This will create quality problems. Also, since the procedures and methods will be set in the software (standardized), we may not be able to deviate from that as we do now. ***Bringing into the system, make it more systematic and people will become more efficient. I can understand that and I like it. See I am developing software. Like a software engineer, I can understand that well. We will become more disciplined. But at the same time since what we do will be more visible to the superiors***, I think no one will question the ERP plans and the procedures. Also, due to integration, we won't be able to deviate from the set in procedures. It will be difficult. The system won't allow you. See the visibility can go up to the MD within this company itself. All operations can be archived. ***I think we will be stressed. I mean there will be increase in work stress. We will also be in a predicament.*** We will be forced to hit the ERP schedules. It means we have to be hard on the operators, which is quite hard in this situation. We will be between the operators, the system, and the management.
I: [Jaffer], I am quite curious. You see a possibility of difficult time for supervisors. Still, none of you talked about this to your managers, engineers or the management?
J: See I told you earlier, they are not accessible…Also, they may give us some opportunity when it comes to we start using it.
I: I have two doubts: See Mark (assistant production manager) discuss with you guys, right? ("yes"). Then, why you didn't talk to him about your concerns? Also, you are familiar with software development, right? Do you think that it is possible to modify the ERP when it comes to the stage that you guys start using it?
J: It may not be possible to modify the program. Rather, I think it is not possible. But, then we are not in a position to talk about these things to the management. From our position it is really a bit dangerous at least. ***See bluntly, the point is that if you start doing such things, tomorrow you may have no job. None of us will want to take such risks.***...See you made me tell things openly.

Employees like Jaffer were obviously swayed by the identity discourse (notice the reference to software engineers, desirable increased professionalism and efficiency).

They also believed in the discourse that favored ERP's global "professional" practices vis-à-vis "unsystematic" traditional" practices. Thus, to this extent, the identity discourse and the ERP discourse favoring its global practices were hegemonic in nature. But, at the same time, they did not consider it as a benefit without costs. Interestingly, over time some of these engineers and supervisors (group 4 in Figure 6.1) who half-heartedly reproduced the discourse of enabling discipline, increasingly focused more on the constraining aspects of the discipline in their daily discourse. This marked the emergence of a different interpretation of the 'disciplining' technology frame, that is ERP as management's disciplining tool that constrains employees' actions (in contrast with the earlier frame ERP as a disciplining agent that enables employees' actions).

6.3 Stage3: ERP a disciplining tool-the constraining face

Here is a quote, which is a representative of this group's expression (from an interview with a production supervisor):

"Once we are time compelled, we cannot focus well on the quality parameters. We will be pushed to enter the data in time and it takes a hell lot of time. Now, [WestIndia] competes on quality not on cost..our cost is pretty high... it will impact the performance only negatively"

This group interpreted that the new "time compulsion" would lead to poor quality adversely affecting the performance. More importantly, this group's understanding was that the ERP was the owners' idea to gain more control (that included labor control) over the plant since they are geographically away from the plants. In this group's understanding, in ERP, this central control was achieved through setting standard procedures from which the plant should not deviate. Further, sitting in the owners' country they can monitor whether the plant is deviating from the standards. For example, below is part of a group discussion.

One of the supervisors explained: (B)ringing the procedures into system makes it more systematic, standard, and difficult to violate. In the existing system, we can violate the procedures and no one will question it. In ERP, it will be *visible* to others (superiors). Also,
Another one intervened: ..when you've to enter in time and that also hourly data, certainly it makes you more visible to all who have access, right?".
The first one continued: "Also, due to integration, I think, ERP won't allow you to violate the procedures…So the system itself will force you to follow its procedure and do things in time…In the plant, the reach of such monitoring goes straight up to the MD.

This group interpreted that the effect of the changes in the temporal aspects such as time boundedness and adherence to sequence would be more employee visibility. They also projected that the change would result in "loss of flexibilities" (for example the flexibility of customer push-in). At this point in time, the managers and the consultants interpreted such "flexibilities" (e.g. customer push-in) as "unsystematic practices". For example, see an excerpt from an assistant manager's (APM) interview:

APM: We know that our system is wrong..
I: means?
APM: Means everyone is following one's own style. There are no standards and no systematism..The production is completely in the hands of individual AEs (Asst. Engineers) and supervisors. Whichever AE comes in the morning (in the morning shift or generally at the beginning of a shift), everything depends on that individual. If he decides that today this (order) should not be run rather I will take it up tomorrow, he will divert the whole stuff into another (order) production (referring to material diversion practice). He will take up the production (of the order) of the customer who pressures him more…we have such unwanted flexibilities.

Thus, at this point in time, in the managers' discourse, the flexibilities were signals of inefficiencies. But, for some engineers and some supervisors (group 4), these flexibilities were facilitators of customer responsiveness. Further, while attributing disciplining agency to the management and ERP as a mediator of this agency (in contrast with the earlier image—ERP as a disciplining agent, not a mediator---that the

consultants and the managers propounded), this group defined discipline as making employees' activities more visible to the management and thereby more monitorable, while the management's activities hidden from the employees. Thus, for this group ERP was management's panoptic surveillance instrument (Foucault, 1977). But, given that they took the strict procedures (which implies time boundedness) as the owners' requirements, and suspected that the MD himself may be involved in the monitoring, and perceived that any voice against the management could lead to the termination of employment as it had occurred with the "opposing" functional manager, PM, and some operators, and given this group was placed at a structurally lower position in the formal organizational hierarchy (see Figure 6.1), many group members felt it wise not to speak up. In other ways as well, this group (mainly production supervisors) was excluded from the ERP negotiations by fiat, and thus their voice was cut-off formally. As a result of the exclusion and perceived coercion (due to the institutional arrangements and preceding events), the technology frame that interpreted the ERP as the management's panoptic surveillance instrument, and the associated call for retaining the local temporal aspects (e.g. flexibility in timing of data recording, shiftwise report as opposed to more broken down hourly report, provision to skip sequence) did not last long. Instead, it appeared that there was a shared consensus on the enabling disciplinary agent technology frame. *At this point in time, it seems that at the organizational level, the disciplinary agent technology frame was stabilized and closed through the effect of a combination of perceived coercion and sensegiving discourse that related the technology frame with a desirable identity.* We may also conclude that at the individual level, the combination was applicable only to some members of group 4. I suspect that the perceived coercion was more diffused. To understand the likelihood of a more diffused perception of coercion, we should look at WestIndia's labor relations and its current changes.

6.3.2 Ongoing changes in WestIndia's labor relations

In chapter four, I had presented a brief sketch of WestIndia's history of labor relations. I had mentioned that WestIndia had faced employee strike in the years 2004 and 2006. The 2006 strike had turned violent and the police was called in. Both strikes had invited media attention. In the media the then MD (one of the owners of WestIndia) had threatened that in the event of one more labor unrest he would relocate the company to Sri Lanka. Given that WestIndia was seen as a back up to Sri Lankan unit, for WestIndian employees, this threat had significant plausibility. Moreover, the high unemployment rate (10% in 2007) and low job opportunity made such plausibility a disaster. The comments of some employees related this plausibility with the disturbances and the ongoing ERP implementation, though such comments were very rare[41]. For example, see part of a conversation during testing of accounts receivable sub module:

Accounts officer: If we don't implement this properly, we may get a salary cut
Administrative assistant: If things don't go smoothly, the white man will take his bed and leave (referring to the possibility of company closure and the current labor unrest)
Project coordinator (laughs): Here, even God doesn't know what will happen. Let us do our best now..the guys there (referring to machine operators) don't get it.

Let us look at what "the guys there" had been doing this time. In WestIndia, as my interviewees mentioned, the awareness of owner (or owner representatives)-worker division was deep. The staff members took them as owner representatives when they dealt with the operators, and in turn, the operators took the staff members as owner-representatives. The relationship between them as well as between the management and operators was "explosive" (as a production engineer remarked). The operators

[41] I had only two instances in my data

came to vehemently oppose the recent standing orders. Below is a slice from an employee council meeting (a meeting that the management held with worker representatives) that discussed the standing order issues:

Worker representative (in shouting voice): Sir, (addressing HR manager) when you talk, you highlight only the laws and rules that are harmful to us..Have you ever spoken of the laws and the rules that are favorable to us? Have you ever made any changes in our work according to those rules? Never!

…….

When the HR manager mentioned that like TUs in the State, the operators came to take management's every move as capitalistic and hence were trying to exhibit an anti-capitalistic spirit, worker representatives responded sternly:

"……sir, it is our desire also that WestIndia runs well. Don't think that we are ideologically against the management and the company. No! Not at all!! We too don't want the company to be closed. But, you have to stop behaving badly with us; learn to behave decently."

Meanwhile, the management was trying to fix the salary of operators as 35% performance based and 65% fixed. The worker representatives rejected the management formula of salary calculation. Instead, they stuck with 5% performance based and 95% fixed which the management rejected. Subsequently, the operators staged a 'lightning strike' (a wildcat strike) followed by a two-day strike. The operators also staged a public protestation and manhandled the HR manager. The salary fixing issue was taken to the district magistrate's office. There were rumors flying around about the immanent closure of the company. See a production supervisor's comment during his telephonic conversation with a friend in another company who had resigned from WestIndia. "Gopal, you escaped. See we are sunk to our nose…Don't know when the shop would be closed."

By this time the management had terminated the functional manager, PM, who opposed the adoption of ERP practices vehemently on the ground of irresponsibility with respect to cost. In local stories, the employees connected his termination also with his opposition to ERP practices. All temporary workers had also been terminated. In this situation, it is highly likely that the perception of coercion was more widespread. *It then seems that many employees, especially the employees at lower hierarchical position such as supervisors, reproduced the enabling disciplinary frame partly due to the perceived threat or coercion. Therefore, it is plausible that the stabilization and closure of the enabling technology frame was a result of the combination of the sensegiving discourse, which was hegemonic in the case of some employees, and coercion (institutional), both rhetoric and institutional*.

Meanwhile, the labor relation was getting worse day by day. Given the labor unrest, although TU with political affiliation was not allowed within the premises of the local Silicon Valley (software park), the management was apprehensive that the operators had been secretly trying to form a TU with clandestine political support. The management's fear would look reasonable if we look at the incidents at other workplaces as the media reported it. Most of the worker unions had political affiliations and were called TUs. For the past 25 years, media had been replete with the story of "anti-capitalistic" TUs (especially with Marxist communist affiliation[42]) opposing the "capitalistic" management, resulting in closure of companies. But, there had been a change in the recent years (Malayal Manorama daily, January 9, 2008). Still, the managers at WsetIndia strongly believed that the operators were driven by an anti-capitalistic Marxist-communist ideology and the political support. As the

[42] From its inception in 1956, the State has been ruled by Marxist Communist coalition in almost all alternative periods.

production manager told me in a casual conversation, to operators, they did not want the ERP to look like a "monitoring tool of the capitalist". Such a picture, they fear, would precipitate worker resistance since they thought the operators had subscribed to an anti-capitalistic or Marxist-communist ideology (for example, see the discussions in employee meetings). Hence, they were careful about what was getting inscribed into ERP and how ERP was talked about.

While these developments were going on, almost in tandem with the technology frame of ERP as a disciplining tool, another technology frame appeared in the daily discourse, ERP as a transparency increaser. In the context of managers' concern about the worsening labor relations, this frame seems to be managers' yet another sensegiving discursive attempt to redefine the disciplining tool frame into a neutral technology frame. At the same time, the transparency increaser frame was based on the managers' ongoing sensemaking that occurred at some point in time[43].

6.4 Stage 4: ERP a transparency increaser and an objectivity provider

To better understand the overlap of transparency increaser frame with the disciplining tool frame, and in turn, the path dependence of the transparency increaser frame, first I take stock of the past occurrences.

By this time, the implementation of the production module had picked up more momentum. The consultants had completed mapping the links between different Bills-Of-Materials (BOM) and the production control plans into the ERP software. The production staff had populated some sub-modules with production data to start the testing of the sub-module. Also, the trial use of the sales module, accounts receivable

[43] I do not have data to know when this sensemaking occurred

and payable sub-module, and inventory module were going on. In none of these modules were there significant changes from the standard ERP software. The only exception was the tax system since the sales tax system and the income tax system of the State as well as the government of India were significantly different from what the standard ERP offered. Thus, as far as the production staff was concerned, the main modules, which they would use, such as inventory module had the ERP's global work norms. The production engineers had started trial using some sub-modules of the inventory module. It was during such trial use that the frame of enabling discipline stabilized. Before its stabilization, the manager-consultant coalition's sensgiving discourse of enabling discipline met with the supervisor-engineer coalition's sensegiving (counter) discourse of disciplining tool. Meanwhile, there was ongoing labor unrest over the issues of salary fixing (performance based pay vs. fixed pay), which in turn, was evocative of the conflicts between the supervisors and the operators over the subjective nature and the lack of transparency of performance appraisal procedures. Until 2004, there had been frequent clashes between the supervisors and the operators over the lack of transparency in performance appraisal. It was said that in 2004, the managers made the performance appraisal more objective. Yet, the tension over the transparency of performance appraisal was still there (for details, see Appendix 6.1). Moreover, as we have seen in the discussion about the worsening labor relations, the operators were also concerned about the increasing labor control (by the management) in the form of increase in number of standing orders and of the checks on labor productivity. In this context, *I argue that the manager's sensegiving discourse of ERP as a transparency increaser was a strategy to not only dilute the strength of the disciplining tool discourse but also align the supervisors' interest with that of the management by cleverly using the supervisors' current concerns.* Below, I explicate the grounds for my argument.

During the discussion of the discourse of ERP as a disciplining tool, I had explained how the disciplining tool frame emerged. The logic was that the ERP increases the employee *visibility* to the superiors making the employees more monitorable and thereby more disciplined. The concept of visibility lies at the heart of this discourse. Now, the managers focused more on the visibility of operators (as opposed to supervisors) and implied that the increased visibility leads to more transparency. Thus, they shifted the focus of technology frame. For example, below is a part of a manager's casual statement when two production supervisors and a production engineer were present.

"Now, we will get ***actual facts and figures*** (through ERP). Those may be different from our assumptions..not assumptions, may be our desires or wishes and our viewpoints. Instead of all these an ***overall picture will come out***..as the ***data input increases***…Now, say *about an operator*, everyone thinks that he is smart and generates a lot of output.... When you look at the ***facts*** (that ERP produces), he may be cheating. Same thing could happen in stock, etc. I mean when you get ***actual figures***…***can use these facts to convince people, even operators, more easily***."

See a reflection of the two main points--ERP as a fact producer for which more data entry is required and the facts can be used to convince operators--in an interview with a production engineer:

" Now we have a lot of delays in production. But we don't know the reasons. We make only guesses that it is due to material shortage, it's due to underutilization of resources (this refer to operators too), etc. ***But ERP will show the exact reasons*** for the delay. We ***need to just enter more data and the data correctly without any error***. ***It may show that the operators did not work full hours.. When we show them (operators) the output, they will get convinced.*** Then we can counsel them or do some thing like that. The issue now is that they don't know the mind of the management. They don't trust the management…We have to convince them. They (operators) think that the top always try to crush them and to exploit them. They don't understand that if the company grows it's is good for everyone…***But if we convince them, these will be resolved***. When there is a system like ERP, it is easier to convince them. Since they will trust the system, we can use the system to generate trust in the management…***will be especially beneficial to supervisors***."

In such statements, unlike the discourses we have seen so far, the central actors came to be the operators and supervisors, and the supervisors and the management came to have the same goal--convince the operators and gain their trust. To reach that goal, both had the same means- ERP produced facts. This is obviously an attempt to align supervisors' interests with that of the management (Bacharach, Bamberger, & Sonnentshul, 1996), and in turn, to produce a 'normative consent' (Haugaard, 2006) to managers' actions.

Below is another slice from a production engineer's interview:
"***ERP is a transparent system***. It has no mask and ***you can't mask things*** in that system. So everyone including ***the operators will automatically believe ERP***. Since they don't know this right now we can convince them through training…***greatly helpful to supervisors***".

As the implementation progressed, the frequency and the clarity of such statement also increased. Below are slices from the interviews of a senior engineer (QD) and a functional manager (FM) from two different departments.

QD: ***Their (supervisors') work will be smoother since production flow will be balanced and well planned, and they will have objective transparent measures of (operators') performance***. They won't be asked to work hard during the fag end, usually towards the end of the month to meet the given KUSD (turn over in USD) operators will be tightened and the production will be pushed hard. It will help the supervisors too (in addition to operators). Also, once you have ***all information in the system*** and the system is able to perform the analysis, the ***measures will be more objective***. S***ince it is there in the system it is transparent.*** We can show to anyone at any time…***will become a big help to the supervisors.***

FM: You raised their (supervisors') concerns (about lack of involvement and increased work). They are the people who have been involved from the very beginning as ***it is helpful mainly for them***…Theirs, if they have, is a wrong impression. If any of them have expressed such concern to you, you should notify us…See, ***we have been telling them that it is for their benefits that we implement this software…It (ERP) makes things transparent, automatic, and easy for them.***

The excerpts above show clearly that the managers (and some engineers) were mobilizing a sensegiving discourse that suggested implicitly and explicitly that the supervisors should be ready to input more data for their own benefit of increasing transparency and objectivity. But, what this discourses pushed to background were the following.

Note that there was a change in the nature of supervisors' work. Earlier, they had more materials, machine, and man management activities. Now, the managerial nature of their work is changed into more data entry. The increased frequency and amount of data entry rendered the supervisory acts more visible, and in turn, closely monitorable by the superiors. As we have seen earlier, the managers were well aware of this increased monitorability and the potential negative impact. For example, see some managers' interview excerpts that I reproduced earlier (p: 212). They mentioned possible loss of supervisors' discretion, increase in monotony of their work, and increase in work stress as negative consequences. The point is not just that whether the supervisors agreed or not with such a change. More importantly, neither the management negotiated the potential micro-monitoring before hand with the supervisors (and operators) nor did they listen to the supervisors' concern about the potential negative impact (for example, see p: 206). Instead, the management excluded the supervisors from the technology modification by fiat and when the supervisors tried to mobilize their concerns, the management discounted such informal influence. The supervisors were expected to simply "obey" the superiors' "command".

See a supervisor-turned-assistant engineer's comment during an interview:
"This is my thinking. In the case of production, till and including supervisory level, people should have an idea about from such and such days we are going to have such

and such things in such and such manner making such and such changes. They should have been involved in the discussions..atleast they should've been given input..then give them time to change and thus gradually it should proceed. The other way, on a fine day if commanded to enter only in ERP, ***everyone will obey. We'll force us to obey.*** But which way is better, one should think. Nothing may happen here even if you adopt the latter way…Instead, ***demanding me to act in a particular way on a fine day onwards is like creating a smoke shield before me. I will know only the 3-4 windows that I enter the data into. And this doesn't increase the transparency!*** That (short pause) is not good. But since a team is assigned this duty, ***we can't speak…we have to keep our mouth shut..Our voices are not heard…*** I am not blaming the team. They may have their own schedules and ideas. But, we have no idea about it, and no information."

In sum, a) although the management knew the potential negative impact of their choice (that they made during the technology change negotiation) on the supervisors, the management did not hold prior negotiations with the supervisors, b) instead the management excluded supervisors' voice from the negotiations about technology modification, and discounted their attempts for informal influence, c) at the same time the management tried to discursively align and shape the supervisors' interest with that of the management. In that attempt the managers *knowingly* downplayed the potential negative impact of increased data entry and highlighted that as beneficial to the supervisors. This is the unethical part of ERP implementation that occurred in a reputed Western multinational organization. Also, this instance shows managers' attempt to gain ideological leadership (Gramsci, 1971).

From the data and analysis I have presented so far, it may seem that the transparency discourse was related only to the production activities or performance appraisal. The transparency increaser frame increasingly gained more dimensions such as transparency in costing, transparency in reporting, and transparency in decision-making process of departments. For example, see an excerpt from an assistant manager's interview:

"Now, I can manipulate a report to safeguard my interest…Sometimes people do that

here. In ERP since report is already there, it will show up all hidden interests, if at all anything is there. There is a transparency in reports."

By the time, the frequency of the disciplinary tool frame reduced significantly in the daily discourse and that of the transparency increaser and objectivity increaser frame increased (gaining predominance), the implementation of the production module was running in full swing. The managers had several discussions with the consultants. Initially, the consultants went ahead with the usual approach of minimally changing the software. But, when it came to the discussions regarding the release of customer orders for production and the assignment of jobs to machines, the production managers argued for incorporating the "flexibilities" that the local work practices provided. This marked the emergence of a new technology frame, ERP a flexibility reducer.

6.5 Stage 5: ERP a flexibility reducer

So far the manager-consultant coalition had grouped the customer push in and the material diversion as a part of the "unsystematic practices" that WestIndia followed. But, now, the production managers and some other managerial employees came to interpret them as "flexibilities" of the WestIndian system. In turn, there was a new sensegiving discourse mobilized around the technology frame of flexibility reducer. This discourse presented ERP as an imposer of rigid standard practices and consequent reducer of the valuable flexibilities that some local practices provided. Below are some representative quotes:

An assistant manager (APM): It (material diversion) is not be available. This is the system limitation. Actually, we are loosing a lot of our flexibilities.

A manager (PM): As I said in the meeting, we are loosing the flexibility to push-in customers

Production engineer: Now, we can redeploy the operators across lines and functions. That flexibility is lost.

The flexibility reduction discourse highlighted different types of flexibilities such as flexibility with respect to a) manpower (e.g., flexibility to re-deploy operators across different production lines while the production was going on), b) materials (e.g., flexibility to use alternative materials instead of the materials that the ERP software assigned to a particular job), c) machine (e.g., flexibility to use alternative machines instead of the machine that the ERP software assigned to a particular job). Correspondingly, there were negotiations over some of the practices, which the employees perceived to have provided flexibilities. These practices included customer push-in and material diversion—the two local practices that I analyzed for understanding the underlying temporal norms (see chapter 4, pp: 80-101), clustering through redeployment of machine operators, and manual variation of oven annealing. In the following paragraphs, I examine the content of negotiation, the negotiation outcomes, and its implication for existing power relations. I take up the two local work practices, which I think had more bearing on the work life of people and the technology modification. These work practices in the reverse order of their negotiation are a) material diversion, and c) customer push-in.

6.5.1 Pushing in the customer push-in

We have seen that by this time the production managers came to interpret certain local practices as flexibility providers. Further, they assessed such flexibilities as valuable necessities. For example, during an internal discussions of production department, the an assistant manager said, “We saw the ERP job scheduling in Sri Lanka: from this time to this time transformer 1; then from this time to this time another transformer 2..

I don't know how they can run it so correctly. What if they miss some? What if an unexpected order comes? What if an emergency order comes? ..The complete schedule is gone!..I think ***we got to have more flexibility in our planning. That is an essential necessity***". Some production engineers echoed the necessity of these "flexibilities" in order to meet unplanned production demands or emergency customer orders, which from their experience they expected as a part and parcel of WestIndia. Below is a part of an interview with a manager:

"Take the September example that you observed. …[Due to customer push-in]…we could not meet the due dates. We could inform the customer only after we slipped. In ERP, if this happens, we'll be able to inform the customer in time. But, the ***flexibility*** to change the order preference [the "pushing in"] ***will not be and cannot be eliminated***."

It was the same manager, who in his internal memos, expected WestIndia to 'stick with the dates' since the dates would be based on reliable estimates that the ERP would provide (see p: 183). Now, he took customer push in as necessary, though it might "disturb the planned completion dates". These were the same managers who chose to inscribe sequence adherence and time boundedness although some engineers and supervisors had interpreted that choice as leading to reduction of flexibilities. Now, although the consultants sternly warned that "accommodating the flexibility" (push in) would upset the adherence to production plans and schedules, highlighting the possibility of getting unexpected and emergency mandatory orders from the Group owners and others, the production managers (and some engineers) insisted on encoding the customer push in. To understand the reason for the flip as well as the influence of politics on the decision-making about technology modification, we need to first examine what went on during the negotiation.

Before analyzing the negotiation, I briefly describe the customer push-in (for details, see chapter 4, pp: 81-85). In WestIndia's production system, the customer push-in occurred in two ways: 1) before the release of the customer order for production, that is, production engineers change the rank order of the customer order in the 'ready for release' list of customer orders, and 2) after the release of the customer order for production, that is, during the production of the customer order the production of an ongoing customer order is temporally suspended, and instead the 'emergent order' which was pushed-in is taken up for production. Below, is an empirical example of the second way, the preference change after release (an excerpt from a manager's interview):

" Take the September (2007) example that you saw. One order took a week more than we expected to complete since we got a new order in between. Night he just rang me up. That moment itself I asked [the shift engineer] to start. In our calculation we could finish both order together in the next week. That delay was negotiated with the (first) customer and was fine with him. We did not reconfirm the second order. Anyway, this (second order) got lagged and overflowed to the next week. Consequently, we could not meet both the orders in time. Also, we could inform the customer only after it happened."

During this interview, I drew a picture in my field note to understand this situation better. Subsequently, the manager verified it. Below is that picture (see figure 6.2).

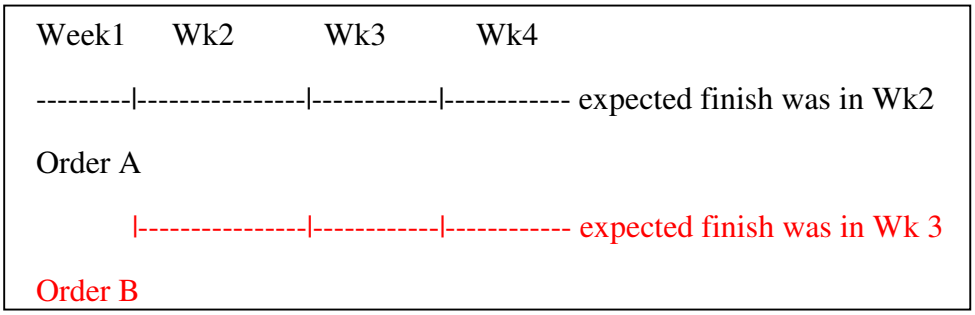

FIGURE 6.2 AN ILLUSTRATION OF CUSTOMER PUSH-IN PRACTICE

[Order B was pushed in replacing the production of Order A. Note: a) 2 weeks production cycle time for both order A and order B, b) skipped steps in the sequence of order release: a) in the system no order booking, no freezing of order, and no confirmation of order—these were activities of the Sales division]

There was an internal debate among production staff (managers, assistant managers, engineers), purchase managers, store officers, and the project coordinator. One production manager (PM) articulated the essence of the production staff's argument succinctly:

"If we follow ERP procedures, it will reduce our flexibilities. Also, we have to completely rely on the system. In our situation, we may not be able to strictly follow the ERP plans [production plans that ERP suggests]. Then, we may have again unplanned production at least in the beginning. So better we keep the flexibilities, at least for the time being, may be, later we can change it. If we don't keep it, we will lose customers. It might also upset all other plans".

Even though others argued that it would take WestIndia back to the old pathetic situation, given the well-accepted unquestionable expertise of the production manager, the group agreed to ask for incorporating the customer push-in into ERP. After the discussion, they called in the consultants. The production manager (PM) and the project coordinator together explained that WestIndia got and would get unexpected orders even from its group owners, which it cannot avoid, as it is from the owners of the company. The consultant responded, "I doubt whether it's possible in ERP". Then the production manager said, "but we have no other go".

Initially, the consultant argued that given the system limitations, it was nearly impossible to incorporate the customer push-in. Thus, there was an attempt to create a perception of technology non-affordance. But, the production managers replied that

since they already had yielded to adopting other ERP standard practices, this time, the consultants should modify. They also told that the company's survival depended on such customer responsiveness. Interestingly, the production staff argued for encoding customer push-in into the ERP system, knowing that it would nullify one of the desired outcomes of ERP implementation—time boundedness. At the same time, they seemed to have believed that "unsystematic" practices like customer push-in that causes lack of adherence to planned dates (or schedules) are "not good". For example, see some excerpts from the interview that I took during this time:

PM (a manager): ..it ***[customer push-in] is wrong..but, the issue is not whether right or wrong, but its necessity..for practical purpose.***

AM (an assistant manager): There are two things. First we don't have much strict planning. ***Our planning is quite flexible***. Still, we managed well for almost 10 years. Some things we do wrong like the lack of adherence to planned dates and the push-in. It's like a ***necessary evil***. ***In the current situation, we need precautions like push- in***.

Note that the manager interpreted the necessity of customer push-in as a precaution that is related to the current situation. Unclear points are a) precaution against what, and b) the meaning of current situation. We will come back to this question later. After a long debate, the consultants divulged that they had no access rights and had to contact the vendor, and that it would take more time and efforts. Finally, after two months of discussions the vendor agreed to make the modification. The production staff had mentioned that in order to enable the second type of customer push-in (when the production is going on), they would need material diversion.

6.5.2 Negotiating the material diversion

Before presenting the episode of negotiation, I briefly explain what material diversion means. Material diversion means materials that are reserved (in the Information

System (IS)) to be used for the manufacturing of one transformer are instead used for manufacturing another transformer. There were two types of material diversion in the existing local Information System (IS), which occurred at two different stages: 1) in the IS supervisors make changes in the reservation of materials allocated to one customer order by reserving it for another customer order before material is issued, for which the system would ask for engineer's approval, and 2) diversion of the material after its issue: the material reserved for order 1 (the material that is now already issued against order 1 and kept in production sub store) would be diverted to manufacturing of order 2 with *the authorization* of the manager (in day shift) or engineer (in night shift since no managers would be available) on the shopfloor. Subsequently, the engineer or the managers would edit the reservation in the IS. The supervisors had no access rights to edit. Thus, this type of material diversion was under the tight control of the managers. The managers argued that material diversion increased machine utilization. Historically, machine utilization was taken to be very important for WestIndia. Below, is an empirical example for type 1 material diversion (excerpt from a production engineer's interview):

" See there came an order today. The due date for that is November 15 (two weeks away). I reserve the material for that today and then give a list of what materials are lacking to the Purchase. Assume tomorrow another order comes that needs the same materials. In that case I will get a date only after November 15 since I already have booked the materials for November 15. Or else a lot of materials should come in between. But, I have to do the order that came today before the order that came yesterday. In that case when I go for reserving the materials (for today's order) it (IS) will show no materials since the available materials are already reserved for the other (yesterday's) order. Then, I or the supervisors with my approval, will divert (change the reservation) the materials to this order. Then those 100 pieces (material reserved for yesterday's order) will come to this one (today's order) and there will be none available to the other (yesterday's order). I don't know whether such provision is there in ERP. It is necessary. It will become necessary. Since booking and ordering are connected, it is required. Then only we will get correct date."

Two weeks after the negotiations about the customer push-in, the consultants took up the issue of material diversion since the managers had asked for incorporating the material diversion. Below, see the consultants' (C1 and C2) response.

C1: Hi, Alex [PM], Rex [PC], we discussed this earlier [during customer push-in discussion], and we tried our level best after that. No way. The system needs each material to be identified with a unique transformer [through transformer number] before we can make material requisition and issue. You can't allocate the material to the transformer you like after you get the material issued. Otherwise also, you think, isn't it weird? The natural sequence is to plan the material with respect to the product before you take the material."
PC (jokingly): But our situation is a little weird and peculiar. So we need a weird solution. (PM smiles; while PC laughs, others chuckled to themselves.)
C2: As we told you earlier, you know that, had there been some provision to change, we would have helped you. You see, we are doing the laborious customer preference interface [customer push-in]. We even took the pains to convince [the vendor]. But, sincerely the system won't allow us to do what you ask (the second type of material diversion), especially retaining the access right structure as it is…but we can keep the process under control".
……..
C1: The re-reservation (first type of material diversion) although very difficult, we can manage and we can keep the same access structure. But, if you really want the editing facility (the second type of material diversion), it is extremely hard, but may be possible. But, there is no way we can retain the access rights [this means supervisors would be able to divert materials without manager's or engineer's approval].

When the mangers learnt that the incorporation of the second type of material diversion would reduce their control over the supervisors' act of diversion of materials and that it would be technically more difficult, they dropped the second type of material diversion. Recall that the managers had argued that the second type would increase the capacity utilization and had projected it as very significant. Now, that functional consideration gave way to the political consideration of keeping the existing power relations and the managerial control over supervisors' job (notice there was no issue with the process control but only with the labor control). It is also interesting to note how consultants shaped the perceived technology non-affordance of the users,

which partly resulted in dropping a useful (in managers' assessment) technology modification. Perhaps, as a result of these two dynamics—political consideration and perceived technology non-affordance—only the first type of material diversion was incorporated. That is, in ERP, the consultants provided a user interface so that the user can manually change the reservation of the material only before the material is issued (but not after it).

The technology modification--the result of the negotiation—occurred through the incorporation of two local practices. This result had a number of effects on the work life as well as the ERP software. The incorporation of material diversion before the material and order release, as the consultants had warned, led to ERP showing negative numbers in inventory stock of materials for the customer order from whose pool the material was diverted. Consequently, the ERP postponed that customer order to next production cycle that affected the schedule adherence. Material diversion also adversely affected the optimization of material utilization. Similarly, the customer push-in adversely affected the optimization of capacity utilization, various types of costs and times, and reduced its links with material planning. At another level, now, the incorporation of customer push-in and material diversion adversely affected the adherence with production schedules. It also meant that the ERP software came to embody both the so-called Western temporal norms (e.g., time boundedness with respect to data entry) or ERP's global temporal norms and a contrasting set of WestIndia's local temporal norms (e.g. schedule flexibility). Therefore, the cultural context shaped the content of ERP technology resulting in a cross-cultural ERP software. What led to such a result was the manager's choice to incorporate two local practices irrespective of their knowledge about its negative (in their evaluation)

implication. If we assume that the managers were rational[44] (since they made a cost-benefit analysis as visible in their conversations) in making their choice and that their articulation of their assessment is believable and open, the question remains, what benefits did they see as outweighing the assessed costs? Relaxing the two assumptions, we can reframe the question as what can explain the negotiation outcomes?

6.5.3 Explaining the negotiated outcomes[45]

I consider explanations from four alternative perspectives: a) functional perspective (functional utility of the local practices), b) cognitive-cultural perspective (inertia to change and issue of organizational memory), c) technological perspective (technological constrains leading to dropping some part of the local practices), and d) political perspective (political interests of the negotiators). I analyze the strength and weakness of explanation from each perspective. Subsequently, I conclude that the political perspective, specifically the political interests of the negotiators, offers the most significant explanation.

6.5.3.1 Functional perspective

During the discussion of ERP modification to incorporate customer push-in and material diversion, when the consultants asked the reason for such incorporation, the managers consecutively presented two different logics: the logic of capacity utilization and the logic of customer responsiveness (see p: 222-224). When the managers first presented capacity utilization as their concern, the consultants informed that the new

[44] By rational I mean taking actions consciously based on a cost-benefit analysis. I made the same assumption when I analyzed the supervisors' and others response to the discourse of manager-consultant coalition.

[45] I am indebted to Prof. Brian Rubineau who helped me to analyze the negotiated outcomes and particularly pointed out the possibility of a political explanation as the most significant explanation.

utility, an add-on, in the system (along with other utilities) called "Advanced Production Scheduling (APS)" would automatically take care of the capacity utilization of man, machine, and material. They explained the APS briefly to the managers. Subsequently, the managers advanced the logic of customer responsiveness. See that their main argument was that WestIndia gets unexpected customer orders even from the group owners, which WestIndia could not afford not to meet. They also mentioned that the survival of the company itself was dependent on meeting such unexpected customer requirements. When emergency customer orders (that are unexpected) come, for example an unexpected order from the group owners, the managers took the decision to stop some ongoing production and push in the owner's order. They never said no to the owner requirements. Moreover, historically the owner had seen WestIndia as a site to meet their emergencies. Therefore, meeting owners' requirements (as well other unexpected customer orders, perhaps) was critical to the production managers. Then, prima fascia, the managers' argument looks sound.

But, my examination of the archival of the customer orders showed that WestIndia rarely got an unexpected customer order from the owners. From the take over until now (three years span) the new owners have never given unplanned or unexpected order to WestIndia. Even the past owner gave such unexpected orders only rarely. Moreover, even if the managers had expected such unexpected order from the new owners and that meeting such order was extremely important for WestIndia, there were more effective means than customer push-in to meet the owners' emergency orders. An example is the case of sequence skipping. The mangers had used sequence skipping in the past to meet owners' emergency requirement. But, now, sequence skipping, although was technically feasible to do, had not been incorporated by manager's own choice. When I asked about this, the production manager said that he

did not realize that incorporation of sequence jumping was technically feasible at that point in time. Perhaps, he was right. But, then the manager became aware (at least at the point of time of my conversation with him) of the feasibility while the coding of customer push-in had just started. Still, he did not ask for sequence skipping in a manner at least confined to the customer push-in practice. Therefore, the argument of perceived technical infeasibility or technology non-affordance only weakly explains the manager's decision to incorporate customer push-in. We will revisit this point of technology non-affordance argument. In sum, the customer responsiveness argument or meeting the (new) owner's unexpected requirements does not seem to explain managers' choice. Moreover, the managers had not even perceived that they would get unexpected orders from the owners. For example, see an excerpt from my later interview (on June 13, 2009) with an assistant production manager (APM):

I: But then how do you manage the unexpected orders from the Group?
APM: Oh! The group never gives us unexpected orders. They give us at least six weeks time. So we get only well planned orders from the group. That is what we expect in the future too. The problem is only with the Indian customers, not even with foreign customers. Still, we get unexpected orders from Indian customers. But, we do not entertain now that much, unless it is extremely profitable. The profit focus has become stronger now. We do say no to the unprofitable customers.

Another functional argument is that given the increased competition in transformer product market especially from China, it is important for WestIndia to keep the flexibilities that would increase its customer responsiveness. Moreover, historically, customer satisfaction and customer responsiveness had been WestIndia's hallmark. Let me take the latter point first. The employees in their interview had indicated that WestIndia had long-held policy of treating 'customer as God'[46], which WestIndia interpreted as 'you have to satisfy the customer irrespective of the profit you get from

[46] This phrase is a famous Gandhian quote regarding how one should do business. Gandhian philosophy had significant influence on the old generation that is people aged 60-80 years.

that order'. But, after the take over, there was a clear change in this policy. The mangers had been advocating and arguing for an increased profit focus. Also, they had interpreted ERP as a means to increase the profit concern. This point is obvious in the interview excerpt I reproduced above. Therefore, as far as customer push in and material diversion are concerned, the argument of customer responsiveness has to be limited to profitable unexpected customer orders from India. Such orders amounted to approximately 20% of the total profit after sales. Out of this 20% let us see how many could go to other suppliers (than WestIndia) such as Chinese suppliers. Again an excerpt from the same interview with the assistant manager (APM):

I: By chance, did you lose customers then (by saying no to customers)?
APM: Not much. Actually, it is very unlikely that the Indian customers will go to another party. In many of these cases (light specialty transformers) no one else is able to deliver customized transformers within such a short time as we do. So they have to stick with us…We don't think this will change in the near future.

After a calculation of which of the Indian customer WestIndia might lose because of their non-responsiveness to unexpected orders, it came down to a merely 2%. Given that the managers were aware of this point (may not be in terms of percentage) while they took the decision on the incorporation of customer push-in, it is difficult to argue that the customer responsiveness concern significantly influenced the managers' decision.

6.5.3.2 Cognitive-cultural perspective

From a cognitive-cultural perspective we may argue that the norms and values that underlie customer push-in and (part of) material diversion were culturally valued and thus gave more legitimacy (i.e. public acceptance) to WestIndia in the local culture. Therefore, to retain the legitimacy it was necessary for WestIndia to retain the local practices. But, we have seen that the case was just the opposite. Within the immediate

external environment (the local silicon valley), we have seen that the companies that function like a software firm had more public acceptance. WestIndia had taken task efficiency as a hallmark of such companies. Since customer push-in would adversely affect task efficiency and that the managers were aware of it, the legitimacy explanation with respect to immediate institutional environment does not hold good. In the wider society too, we have seen that although flexibility had been valued earlier, now, there is a shift to task efficiency, and the managers were aware of this shift too. Therefore, to gain legitimacy, the managers should have been more concerned about the task efficiency as they did with the implementation so far. They had highlighted task efficiency as a central concern and software engineer, an esteemed and well-accepted professional role, as a desired identity. Since customer push in and material diversion were utilized only for a small percentage of Indian customers, and that WestIndia is a 100% export oriented unit, retaining the legitimacy through the flexibility that customer push in and material diversion provides cannot be significant for WestIndia. Therefore, the legitimacy explanation (gaining legitimacy and retaining legitimacy) also cannot significantly explain managers' choice.

Another possible explanation is from organizational inertia (Hannan & Freeman, 1984; Stinchcomb, 1962) viewpoint. The point is that irrespective of legitimacy concern and functional utility concern, WestIndia did not want to change the habituated practices due to its organizational inertia. The same managers had chosen to adopt ERP practices and thus to change from other institutionalized practices such as sequence jumping so the question would be why is there an institutional inertia in the case of customer push-in alone? Is it that customer push-in was the most institutionalized? That does not seem to be the case. For example, customer push-in was confined only to unexpected orders and the frequency of unexpected orders was

significantly lower than the planned orders. The employees practiced the sequence jumping in the case of expected as well as unexpected orders (although in the case of unexpected orders more steps were skipped in order to increase customer responsiveness). That means, WestIndian employees practiced sequence jumping significantly more frequently than customer push-in. As a result, sequence jumping should be more habituated and thereby more institutionalized than customer push-in. Since the managers were ready to change a more institutionalized practice, the institutional inertia cannot explain the unwillingness to change a less institutionalized practice such as customer push-in. Also, since the managers had opted to retain local practice in one occasion and not to adopt in another occasion, the personality explanations such as resistance to change as personality trait are not applicable in this case. Similarly, the explanation from organizational memory viewpoint also does not hold good here. That is the managers' fear that since customer push-in and material diversions had been so imprinted in the organizational memory in the form of routines and shared mental map, the employees would not be able to change within reasonable time (in the case of customer push in and material diversion) even though they were willing to change. In turn, the managers might fear that the change to ERP practices just in the case of customer push-in and material diversion would lead to failure of the whole ERP software. Similar to the case of organizational inertia, the decision to change a more institutionalized and pervasive practice such as sequence jumping contradicts such 'fear explanations'.

6.5.3.3 Technological perspective

I had mentioned earlier that the perception of a technical non-feasibility that the consultants created (partly) in the minds of the managers along with the perceived loss of managers' control over supervisors' acts resulted in dropping the second part of

material diversion (that is diversion of material on the shopfloor). But, what about the customer push-in? During the modification negotiation with the consultants, the production manager had indicated a 'lack of faith in the system' (as he put it) to generate feasible production schedules or in other words perceived technology non-affordance (the incapability of the system to generate feasible schedules) as the justification for demanding customer push in. In my interview too he repeated the same point. Below I reproduce the excerpt from that interview:

PM: …see unlike in an assembly line, we have a number of variables here. Their system is unable to take into account all these variables. It has only limited features. So we cannot just completely rely on the system. This is what I stressed in our internal meeting too (referring to the meeting I mentioned earlier). That is the issue.
……..
PM: So, we need manual intervention, I mean like customer push in and material diversion. Also, if we could not execute the system suggested plan, we doubt we can, we have no provision in the system to give our feedback. If the system could self-rectify based on our feedback, we could have relied on the system more. We could have then avoided provisions like material diversion or customer push-in and the clustering. But, the system cannot do that. This is what I understood from the discussion and our trial use.

From the above excerpt it seems that technology non-affordance was a significant factor that influenced managers' decision. In that case, why did not the managers ask for manual intervention or user interface to retain sequence jumping? See part of my interview with the production manager regarding this point:

I: To get sequence jumping in, as Roy mentioned, I guess, N [consultants] could have provided a simple user exit or user intervention.
PM: For sequence jumping, they had to provide more access right structures. See they already told they couldn't play with the access right structure. So we didn't push (for sequence jumping).
I: Rex [PM], I have a doubt. Please explain how access right structure is an issue since in the case of sequence jumping it is only engineers who are involved. Also, for MRP and BOM utilities, they already have the access right structures in place, right? Also, they already modified the code. It did not take up too much of their time.
PM: I don't know .net (the software language). So I don't know what they really did.

But, ya, in the case of sequence jumping access right is not an issue. It didn't click me at that point in time.

The manager's point further reinforces the idea that it could be technology non-affordance (as he perceived at that point in time) that explains manager's decision of not asking for sequence jumping. Still, it does not explain his choice of incorporating customer push-in since the same manager had pushed for customer push-in even though its incorporation also involved changing the access right structure. Also, as I mentioned earlier, the argument of technology non-affordance is weak in its explanatory power since the manager came to be aware of the technical feasibility to change sequence jumping during my conversation with him that occurred when the encoding of customer push-in had just begun, and he could have asked the consultants to incorporate sequence jumping at least in a manner limited to customer push-in which he did not do. Then, it seems that perhaps the managers were not as much concerned about sequence jumping as they were about customer push-in. Why were they more concerned abut customer push-in? One answer we have seen so far is that the concern about customer responsiveness drove their choice. But, we have already seen that the argument of customer responsiveness is not significant. Perhaps, it was a consideration, but certainly not the most significant one. Therefore, we need a more significant explanation.

Person-situation research that focus on the moderating role of situation strength (Mischel, 1977; Monson, Hesley, & Cherick, 1982; Weiss & Adler, 1984) has repeatedly shown that in the case of strong situation, the situation will significantly moderate the effect of personality on individual's (and group's) behavioral as well as decisional choices. Above I argued that the strength of institutional, cultural, and market (or functional) environments did not strongly influence the managers' decision.

The technical environment might have influenced the decision to some extent but not very significantly. The situation or environment I consider next is political environment. We already have seen that the political environment in terms of labor relations, and in turn, labor control had increasingly been more salient and significant for WestIndian employees, especially managers. Therefore, it is likely that political consideration significantly influenced managers' choice. I develop this argument further in the following paragraphs.

6.5.3.4 Political perspective

We have seen previously that during the stage of flexibility reducer frame, particularly during the discussion about ERP modification to incorporate customer push-in, the labor relation in WestIndia was deeply disturbed. Machine operators' were staging continuous strike (four times) that included go-slow strike, wildcat strike and whole-day strike. Below, I explain one of the ways the managers tried to mitigate the effect of strike, and in turn, reduce the power of the striking operators.

Some of the operators announced a wildcat strike while the manufacturing of a significant number of orders from an important customer was going on. Many of these operators were employed in the production line where the manufacturing of the important order was going on. Thus, the operators calculated that it would significantly affect WestIndia. The management transferred these important orders to other production lines where they had operators who did not join the strike at that particular time. For transferring the order to another production line (say L2), they had to stop the ongoing production of that line (L2) and push-in the orders to be transferred. Subsequently, the managers and engineers had to edit the IS. These operations (the transfer of order and the subsequent editing of IS) were possible since

customer push-in was incorporated in the existing IS and it (customer push-in) had been in practice on the shopfloor for some time. After transferring the orders to L2, the management shut down the lines where the operators were on strike. The management assessed that this strategy reduced the possible impact of the employee strike on company performance. This was an occasion where the customer push-in became useful to mitigate the "adverse" effect on company performance.

There was still another occasion when the management utilized customer push-in politically. When the majority of the operators went on go-slow strike, the management redeployed the minority of the employees in the next shift clustering them around particular production lines and then transferred the important orders to those lines. Through such instances, the managers were well aware of the potential of customer push-in to handle the employee strike effectively. Given these recent (and therefore vivid in memory) and significant experience with the political use of customer push-in, it is highly likely that the managers considered customer push-in not only as a flexibility provider but also as a political tool to handle labor unrest effectively. I explain the currency and significance in the following sentence. Perhaps, the ongoing labor issues made such potential utility of customer push-in more salient. For example, following the strikes that I mentioned previously, the management declared a lay-off. Given the repeated earlier threat of the management that it would close the company in the case of strikes (The Hindu, July 2, 2003; August 8, 2004), the managers and other employees might have been concerned about the labor unrest. But, one can argue that since the same was the case with earlier owners and that the new group took over the company recently, employees or at least the managers did not perceive any possibility of permanent closure. Perhaps this argument is valid but not strong since the managers I interviewed considered that the strikes and lay off could

lead to closure. But, I do no know how sincere and strong their statements were. However, it is likely that such statements were not insincere since the new MD had closed the company for a week by this time, which he mentioned as a temporary closure. But, he also implied a possibility to permanently close the company. Below is the relevant part from the company announcement that appeared on the company notice board during the operators' strike:

Cir/13/2008 Notice 23/3/2008
It has come to the knowledge of the management that some employees are planning for indefinite strike inciting others to participate in the strike. Therefore, …, the management has decided to publish this notice for the information of the employees…… ***As all the employees know, the company is now facing severe critical situations due to lack of orders. The main reason for the same is that there is propaganda in the industry that there is labor unrest in our company***…… As the situation now stands ***if there occurs any illegal and unjustified strike, the same will threaten the very existence of the company***.

See the response of some managerial staff:
An assistant manager: They (workers) struck in right time. We had a lot of orders as you know. All of them have gone to Sri Lanka or revoked. Now, we don't know what is going to happen..totally uncertain..even the company might close.
Production supervisor: It is like a sinking boat. People started escaping (referring to resignation of some employees). And everyone (supervisors) is looking for job outside.

Purchase staff: This closing is right now "initially"(about the temporary closing of the plant for a week). Who knows this initially won't repeat again. It may be opened for a week, then, again closed down initially for two weeks, and so on until it is out (of existence).

I also highlighted the frequent concern of the managers about the worsening labor relations. They had also mentioned that in such situations they would be careful about what practices were coded into the software and how they were coded. It is in this situation, the managers labeled the incorporation of customer push-in as a

"precaution", although they considered customer push-in as a "necessary evil". All through out the implementation the managers themselves had expressed that functionally customer push-in was not a "correct" practice since it was unsystematic and would adversely affect task efficiency, a component of customer responsiveness. Still, they took it as a necessary precaution that should be encoded into the software. During the discussion about the customer push-in with the consultants, the managers had mentioned the intended utility of customer push in as a tool to switch customer orders when some production lines go slow. Below, see the relevant part of that discussion (Consultant: C, Manager: PM):

C: Why do you want to stop the ongoing production and push in another order?
PM: When unexpected orders come and you are running full (capacity), you have to accommodate the emergency order. You can do this only through replacing some ongoing production.
C: I will give you a user exit to hold back the job order release. Then you can push in the emergency order there (rather than during the production).
PM: But, there is one more important issue. We don't have enough precision about the machine performance. Even the operator performance also can vary. If want to speed up a production in a slow running line, we can transfer it to another line.

Notice that the manager mentioned the utility of customer push to transfer an order from a slow running line to a faster line. Of course, the slowness could occur due to various reasons including problems with the machines. Before discussing these reasons, let us see how one of the production managers explained his decision in my interview:

I: I think you had mentioned that in the current situation you would be more careful about what gets into the software. What is the current situation you were referring to?
PM: I meant the increased competition, our lack of information about the machines, the unpredictability of our own performance, etc.
…..
I: What about the struggles we are passing through now?
PM: The labor issues never influenced my decision. The main issue was customer

responsiveness.
When I presented my doubts regarding the customer responsiveness, after meandering, the manager came to his lack of faith in ERP to generate a feasible schedule:
PM: None of us in production has that much faith in the system.
Then he continued with the issue of technology non-affordance. I had reproduced that excerpt earlier. The discussion went on for some time. Then he mentioned,
PM: Finally, if we don't have such flexibilities (as customer push-in),…., it is our discretion that is lost.
I: Means?
PM: Now, we (the managers) can decide which order to take up and in what order. To some extent only it is left to the engineers and supervisors. But, I can intervene any time if things go wrong and get it okay. So we can easily manage without any problem….But in ERP, if we don't have those provisions (like customer push-in with proper authorization), it will go out of our hands. We have to just follow the system. ***The system may not give a reasonable schedule that we can hit or we have to stretch beyond our capacity***. ***Now, we can decide the limit of that stretch.*** But, even if we want, we can't tighten beyond a limit. In the system (ERP), we can, I guess, tighten it more.

The manager is unable to tighten the production plan and schedule adherence in the existing system, while in ERP he thinks he would be able to do so. But, if the flexibility such as customer push-in were not there, the managers would lose control over the scheduling process. Further the managers would be answerable for not hitting the production schedule, as it is visible to the top management, peers as well as the owners. Therefore, getting the control over setting the production schedule or changing it at the managers' will was very important to the managers. In this context, let us see what the flexibilities such as the material diversion (the part which was incorporated into ERP) and the customer push-in do.

Before the incorporation of material diversion into the ERP (i.e. in the standard ERP), the system automatically firms up the rank order of the customer orders to be taken before a month of the actual production. This occurs in the order firming up utility of standard ERP. Users could change the preference order of the customer order (ready-to-release for production) before firming up the ready-to-release list (next operation in

the ERP software is “release for production”). Once the system firms up the list, users cannot modify the list. But, since the system firms up the list for one-month period and then the production schedules are automatically generated for a month (based on this list), the flexibility that the managers had to change the preference order of the customers and the production schedule (and in turn managers’ control over these processes) was reduced from a daily level of changeability (in the existing system) to a monthly level of changeability. Also, the manager lost the control over adjusting the production due date for one month. By incorporating the material diversion, the managers could change the preference order of the customer even after the system firms up the order. In fact, the managers could change the rank order of the customers just before releasing the order for production, which had a cycle of a one-week period. Whenever the managers change the order preference the system would automatically generate a new monthly production schedule. Thus, in effect, the inflexibility of the production schedules, and in turn, the span of system control over the schedule came down from a month to a week. Also, since the shortest production cycle was one week, the one week scheduling gave the production manager significant control over the production scheduling as well as deployment of operators. This means the managers would not have much trouble with adhering to the production schedules as well as redeploying the operators. At the same time, the system also gave the provision to tighten the schedule dates through which the managers could tighten the supervisors’ and operators’ work. In sum, the provision of material diversion and customer push in by the way they had been encoded increased the managers’ control over the production schedule (directly) and the labor (directly and indirectly).

Still, since the production manager refuted any influence of the labor concerns on their decision to incorporate the “flexibilities”, my argument for the most significant

influence of the managers' (or the negotiators') political interests needs to be strengthened. To strengthen my argument, I reproduce an excerpt of my most recent telephonic interview (dated June 13, 2009) with the assistant manager (I had quoted from this interview earlier):

I: Is it that then contrary to what you thought there is not much use of customer push-in?
AM: Not actually. See we are using it but in a limited manner. That's what I told you some time back. This is what we expected. [I had asked about the frequency of the use of customer push-in before ERP implementation. The manager had told me that they did not use it frequently and that he expected that the use of customer push-in would come down].
I: If it's just for the limited use, I was wondering why you pressed for customer push in…
AM: See, customer push in also helps switching orders between lines.
I: Can you please explain it?
AM: When you have some problems in a line where an important order is going on you can just shut off that complete line or part of it and transfer the order to other lines.
I: What kind of problems?
AM: Machine problems like machine breakdown that will take more time…***then man problems too…(pause for some time)..that (man problem) was the main worry that time***, now…***You know the situation we were in. Anything could have happened any moment in any line. We had to have precautions set in***. I don't see that coming up any more.
[Notice that the managers indicates one meaning of precaution by referring it to labor unrest]
I: What do you mean?
AM: There was a good shake here. After that lines are running very smoothly. .
……
I: What was the shake then..
AM: The management weeded out all bad elements. All those who were making problems who tried to form the TU were terminated..nearly 10 guys..everything done on valid legal grounds…no one could raise any question…The TU leader was fired on the strong ground of misbehaving with a lady supervisor..for calling bad words…like that..then ..finally TS [the HR manager who dealt with the operators strikes] retired.
I: But, there is as such no retirement, right? What happened to TS?
M: TS was made to retire. ..
M: Also, Jack [new MD] gave 40% salary hike to the operators. So they are all very happy. Now, things are moving pretty good..contrary to our expectation, no much hassle for us that would give us nightmares.

In this conversation, the manager clearly indicates that one major reason for encoding customer push-in was the managers' concern with the labor unrest. Therefore, it is quite likely that the managers' political intentions explain the negotiation outcome of encoding customer push in and material diversion.

In sum, the most significant factor that influenced the negotiating managers' decision to modify the technology was their political interests. The political interests influenced the managers' decision in two ways, one directly and the other indirectly: directly through the managers' decision to modify the ERP in order to use it as a means to reduce the power of the employees on strike, indirectly through the managers' decision to modify the ERP in order to gain more control over the production schedule process, and in turn, the labor. In short, in WestIndia, *the negotiators' political interest significantly, and both directly and indirectly, influence the content or body of the ERP software, a technological artifact*. This echoes Winner's (1980) provocative argument that technological artifacts bear the political intention of its creators. However, Winner was criticized for lack of analytical rigor--not considering plausible alternative explanations--as well as for the lack of methodological rigor (see Joerges, 1999). My argument also reflects Noble's (1984) illustration of Braverman's deskilling thesis. Noble shows how management's desire to gain more control over labor led to the replacement of playback tapes in numerically controlled machines with numerical controls. However, his focus is on the replacement of an 'old' technology with a 'new' technology (but not the development or customization of a technology) while I show how political interest partly but significantly decides the body or content of the technology itself. In this sense, technological artifacts may have the fingerprints of its creators' or modifier-negotiators' political intentions. In other words, political intention could come to constitute technological artifacts.

6.6 Summary and discussion

I summarize the case study as an action-response-result diagram in table 6. 2 (next page). In the following summary analysis of the case that uses table 6.2, I boldface and italicize my key arguments and insights.

From table 6.2, it is obvious that in WestIndia ***ERP implementation was a process of multiple actors shifting technology frames over time in their attempt to impose the frames that embody their interest over others' frames*.** For example, during stage 1, manager-consultant coalition (MC coalition in figure 6.1) advanced a frame of delay reducer that embodied their interests. As per owners' demand, the managers had to reduce the delays. The managers framed ERP as the delay reducer and mobilized a discourse around it. Intentionally or unintentionally, they further tied it to an identity that the employees desired—software engineer. The consultant appropriated this delay reduction discourse to preempt the modification of the standard ERP (consultants' interests) suggesting that the replacement of the local practices by ERP's global practices would only result in delay reduction.

During stage 2, based on the trial use and their increased familiarity with the ERP software, the managers' sensemaking evolved further. Thus, by this time, they realized that to reduce delays the employee behavior also needs a change. Therefore, they framed ERP as a disciplining agent that would cause this positive transformation and again made their discourse attractive by tying it to the desirable identity. The consultants appropriated this discourse to suggest that ERP's standard global practices (vis-à-vis the local practices) only would bring about this positive transformation of employees into the desired identity.

TABLE 6.2: SHIFTING TECHNOLOGY FRAMES, THE RESPONSES, AND THE RESULTS IN WESTINDIA

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
TF: delay reducer	**TF**: enabling disciplining agent	**TF:** constraining disciplining tool	**TF:** transparency increaser	**TF**: flexibility reducer (*shift in TF*)
Actors MC coalition PM + other employees	**Actors** MC coalition Group 4 (skeptic)	**Actors** Managers Group 4 (opposing TF)	**Actors** Managers Group 3 Group 4	**Actors** Consultant Managers & Group 3
Action-Response **A1**:Coalition's sensegiving discourse using the frame (TF) **R1**: Employees' reprodn. of the discourse while one manager and associates oppose **A2**: Coalition's approprn. of meta-discourses that favor ERP's global norms + Negative characterizn. of local norms & simultaneous positive characterizn. of ERP's global norms **R2**: Employees' partial reprodn. **A3**: Exclusion of countering views	**Action-Response** **A4**: Managers' sensegiving discourse: ERP practices more favorable & repetition of A2 on the left block. **R4**: Employees' reproduction **A5**: Coalition's sensegiving discourse using TF with explicit ties to the desirable identity of s/w engineer **R5**: Employees' reprodn while some group 4 members remain skeptic of the claimed benefits	**Action-Response** **A6**: Group 4 members' sensemaking: the different TF **R6**: Discounting by managers + managers label the flexibilities as "unnecessary"	**Action-Response** **A7**: Managers' sensegiving discourse using the TF: attempt to align group 4 members' (supervisors) interest with that of coalition **R7**: Reprodn. of the discourse by group 3 and some members of group 4 while others disagree with the managers	**Action-Response** **A8:** Managers' reprodn. of Group 4's discourse & attempt of sensegiving using the TF **R8**: consultant's initial attempts to create "technology non-affordance" perception & later yield
Results Adoptn. of ERP's global practices & trial use +Employees' reflection on how adoptn would lead to delay reducn.	**Results** Adoptn.of ERP's global practices+ trial use reinforcing the frame and structuring user behavior	**Results** Scope of the discourse on the TF confined to group 4 due to perceived coercion and exclusion of these members + Adoption of ERP's global practices + trial use reinforcing the frame and structuring user behavior	**Results** Group 4's frame disappears from the daily conversations + Adoption of ERP's global practices + trial use reinforcing the frame and structuring user behavior	**Results** Replacing of ERP's global practices (& norms) With local practices & norms: cross - cultural IS

During stage 3, some of the supervisors and engineers (Group 4 members) disagreed with the coalition's argument of positive transformation and counter-argued that the transformation would have adverse effect on their work life. They framed their argument into an opposing frame that highlights this potential negative impact. As a response to this opposition and in order to align group 4 members' interest with that of the management, during stage 4, the managers framed ERP as a solution to the group 4 members' (supervisors') difficulties with group 5 members (machine operators), that is ERP as an increaser of transparency in operators' performance appraisal. Later, this frame evolved in many different dimensions (e.g. transparency in production processes, reports, costing process, materials management processes).

During stage 5, the attempt to protect managers' political interest came out explicitly in the flipping of technology frame: earlier the managers' had opposed group 4 members' framing of ERP as a reducer of certain flexibilities, but now the same managers framed ERP as a reducer of the same flexibilities that they had earlier interpreted as unnecessary and unsystematic. I analyzed this flip in the framing (marked with a dark dotted line in table 6.2) and showed that the main reason was managers' political intention to preserve as well as enhance their labor control. Thus, I concluded that in WestIndia***, the negotiators' political interest significantly, and both directly and indirectly, influenced the content or body of the ERP software, a technological artifact***. At this point in time, although the consultants tried to bring back the technology frame they used earlier--ERP a less modifiable standard software--- in order to protect their interests, ultimately they had to yield to the managers' pressure. As the end results in table 6.2 shows, ***the final ERP software***—a mix of ERP's global (so-called "Western") work practices and norms and WestIndia's local (so-called "traditional") work practices and norms--***was an outcome of this power***

play. In WestIndia's case, this also means that the ***cultural context (e.g., the local temporal norms that were in conflict with the ERP's temporal norms) of the implementing organization (e.g. WestIndia) shaped the technology (e.g., the final software) through the political actions—most significantly shifting of technology frames--of the actors involved directly (e.g., the mangers) or indirectly (e.g., the supervisors) in the negotiations about the modification of the technology***.

Similar to the case of GovIndia in the previous chapter, WestIndia case also illustrates how actors inscribe their political interest and the existing power relations into technology. ***To inscribe political interest and power relations into technology, actors used technology framing as a primary process and technology frame as an emerging discursive resource in order to mobilize sensegiving discourses.*** To explain this point, as I did in GovIndian case, I abstract further from table 6.2.

Consider the vertical column in table 6.2. In each column, there is an approximate sequential flow that starts at the top with framing of technology frame (a structure that carries the framer's political interests), which is an outcome of an actor's (e.g., consultants or managers) 'cognitive sensemaking' (Weick et al., 2005). In this process of 'emergence of frames', either some aspects of existing technology frame changed (e.g. expansion of delay reducer frame to enabling discipliner frame) or new technology frame emerged (e.g. "flexibility reducer" frame). Mobilization of interests and its consolidation followed. Subsequently, there was the creation of a consensus about what technology is/should be (a collective normative understanding) and the corresponding expectations or in other words a consensus on the new frame or the newly emerged aspects of the existing frame. This frame was then encoded (i.e., translated into software language and entered into the body of the software). In the

previous chapter, following Joerges and Czarniawska (1998), the creation of a collective normative understanding about technology and the conversion of this understanding into material medium (such as software language) or encoding together I called "technical inscription". The inscribed part of the software (called a module or sub-module) was put into testing and sometime trial use since the software had a modular structure. In the previous chapter, from a structurational viewpoint, I called the testing or the trial use (a form of practice)--an instantiation of the frames (that is structure) and the underlying norms encoded into the software through daily use—"enactment" through daily use. This pattern is repeated in each column of table 6.2. Therefore, the underlying process can be described as emergence of frames or its aspects--use of political strategies--technical inscription—enactment (see figure 6.3, next page).

For the sake of convenience I have shown only three stages. The same is repeated in the remaining two stages too. Overall, the figure shows the process of constructing a cross-cultural information system in WestIndia that includes the process of inscribing actors' political interests into technology.

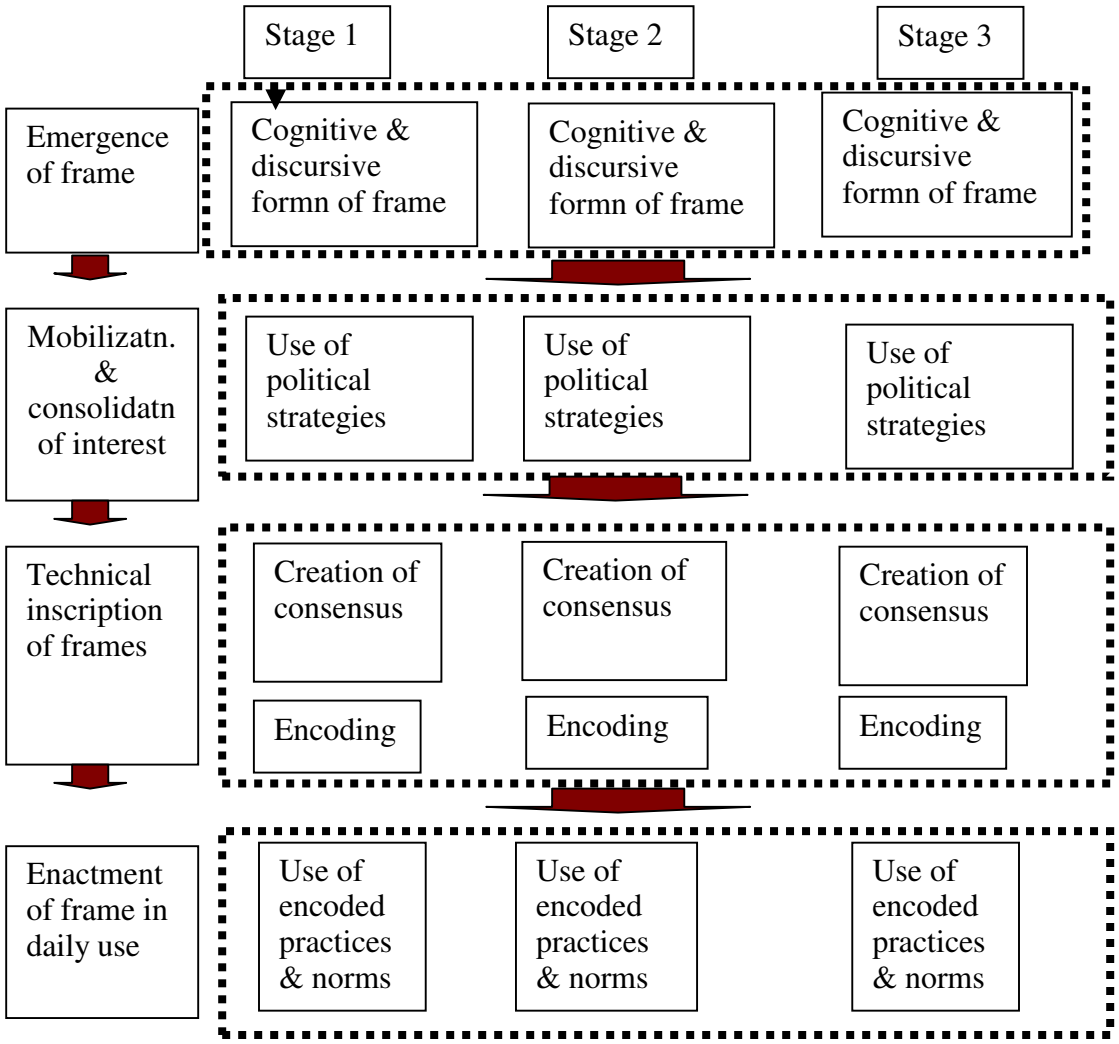

FIGURE 6.3: THE POLITICAL PROCESS OF CONSTRUCTING A CROSS-CULTURAL IS IN WESTINDIA

Table 6.2 and figure 6.3 together suggest that we need to conceptualize technology frame as a political device in addition to the existing conceptualization of technology frame as a cognitive device for sensemaking (see Orlikowski & Gash, 1994). Moreover, while IS implementation that uses technology frames usually focuses on technology frames as an outcome (as opposed to a process), my study highlights the need to focus on the framing process. The benefit of such focus is a better

understanding of the socio-political construction of IS in organizations, for example the use of technology frame as a political device. One of the ways managers used technology frame as a political device in this case study warrants more attention since it is one of the most basic elements of human relations, that is one's occupational identity. Unlike in the case of GovIndia, in WestIndia, intentionally or unintentionally managers tried to form a new occupational identity, which I call "ERP enabled employee equivalent to software engineer". The managers reproduced the meta-discourse in the society that venerated software engineer (an occupational identity). Subsequently, they framed ERP as an agent ("ERP an enabling disciplining agent": Stage 2) that would bring about such a desirable identity transformation. The hallmark of this new identity was task efficiency--a positive hallmark attributed to software engineer--that underlay the frame of "delay reducer" (Stage 1). Other characteristics included "systematism" which indicated a spatial arrangement that looks organized (as opposed to disorganized), and meeting of strict deadlines. ***Thus, the managers used technology frames in combination with hegemonic meta-discourses in the wider society to produce a new identity, an ERP enabled employee who was expected to be equivalent to software engineer***. ***The political dynamics of the identity formation influenced the technical inscription*** of the remaining stages (stage 3 and stage 4) excluding the last stage (stage 5). For example, in stage 2, stage 3 and stage 4, the collective predominant interpretation of ERP was that ERP is an agentic tool that helps its users achieve the new identity (a desirable identity) by shaping the users' work culture. Thus, ERP was understood collectively as a transformer of the organization, which is a reproduction of the popular discourse (Grant et al., 2006). The use of technology frames to create new identity is a rare observation in the IS implementation as well technology frame literature.

The unethical side of this new identity formation is that while the managers knew that the transformation process involved adversary effect (e.g., increased work stress, increased monotony, increased monitoring) on the work life of other employees such as supervisors, they underplayed it. Further, when these employees (e.g., group 4 members) articulated their concerns about the potential adversary effect in terms of technology frame (e.g. ERP as a constraining tool and a flexibility reducer), the managers not only discounted it but they advanced a new technology frame that redefined some potential negative aspects (e.g. increased monitorability) as positive (e.g. increased data leading to not monitorability but transparency and precision). This is the unethical part of WestIndia's ERP implementation. During my analysis I have also raised the ethical issue of increasing monitorability of employees without negotiating it with them before hand and instead excluding them formally from the negotiation process.

The managers' discount of employees' opposing views (which I mentioned above), the exclusion of opposing views from negotiations (e.g., purchase managers' exclusion during stage 1), and elimination of conflicting frames through perceived coercion that is generated via institutional arrangements and actions (e.g. termination of opposing employees) significantly facilitated creation of a "consensus" on frames or the meaning and expectations of the technology. Therefore, ***in WestIndia, these institutional means of creating a consensus or closure, which I called "institutional closure" in the previous chapter, was an important means to create consensus on the meaning of technology***. This implies that institutional closure may be as significant as other means of closure since it is the combination (not just the independence existence) of institutional means with rhetoric and cognitive means that leads to the closure of the meaning attributed to technology, and in turn, its encoding

into the technology. The existence of institutional closure raises doubts on the genuineness and breadth of the sharedness (i.e., how widely and how genuinely the frame is shared) of technology frame that the technology implementation literature usually assumes. I had raised the same point in the last chapter also.

In the next concluding chapter, I interweave the findings of the two case studies and the process models I generated. Through this I identify the central macro process—the core concept in grounded theory's language--in the political shaping of creating a working IS. I also consolidate the new concepts I have developed consistently across the two case studies: institutional closure and technology non-affordance. I conclude the chapter with the potential contributions of my study, the research and practical implications, and the limitations that indicates possibilities of further research.

CHAPTER 7

NEGOTIATING TECHNOLOGY FRAMES

In this chapter, I conclude my research by interweaving the findings of the two case studies and the micro processes that I identified. To answer my research question, I also generate a process model that highlights the core process—negotiating technology frame. My research question is how does exercise of power shape creation of a working information system in organizations. This question was embedded within a broader question of how do organizations create a working information system. Based on my preliminary analysis in the field, I narrowed down the broad question to focus more on the exercise of power that I call politics, which might shape the creation. Further, based on my literature review and my prior experience on technology implementation, I chose to focus on the process of collective sensemaking (Weick, 1995) of actors both directly and indirectly involved in the implementation. In turn, this study is my sensemaking about the sensemaking of the actors, and thus is essentially an interpretive study. To do a longitudinal (over time) and interpretive study, I chose an appropriate methodology—interpretive qualitative case study supported with grounded theory. This chapter presents my conclusions from the study followed by the contributions this study makes, methodological, theoretical, and practical. Finally, I describe the limitations of this study and the scope for further research.

7.1 Interweaving the main findings and the micro processes

Below (next page), in table 7.1 I reproduce the main findings that are common to both cases. As the second column of the table 7.1 shows, these findings correspond to the three main processes (out of the four I identified in the case analyses) that occur in a

nearly sequential manner forming three phases of the implementation.

TABLE 7.1: COMMON FINDINGS FROM THE TWO CASES AND THE CORRESPONDING PROCESSES

Main common findings across the cases	**Corresponding process**
The implementation was significantly an outcome of a power play among the actors. The power play was mainly a process of multiple actors framing and shifting technology frames over time in their attempt to impose the frames that embody their interest over others' frames.	Emergence of frames (or its aspects)
The actors used technology frames as an emergent (in the sense it emerged from actors' ongoing sensemaking) discursive resource through framing it in a way that embodies their interests. Subsequently, they employed it for sensegiving in order to mobilize other group's interests. To consolidate the mobilized interest, the actors used a combination of political strategies such as discursive shaping, coercion, and exclusion of frames that carry the interests that are in conflict their interests.	Interest mobilization and consolidation
Through such mobilization and consolidation of interests, the actors tried to create a normative (in appearance) consensus on meaning of technology (what technology is and what it should be), and in turn, the to-be-done technology modifications, which were subsequently translated into software codes and entered into the software program (encoding). In this way, actors used technology framing as a primary process and technology frame as an emergent discursive resource to inscribe their political interest and favorable power relations into the software program.	Technical inscription: consensus creation + encoding

The above-mentioned three findings that correspond to the three processes in my process models (see figures 5.1 and 6.3) together succinctly explain a significant part of the ERP implementations that occurred in both GovIndia and WestIndia, two radically different implementation environments. Therefore, before discussing other common findings, I explain how the micro process models that I generated can explain these main findings, and in turn, the political dynamics of the implementations. In line with grounded theory methodology, to increase the explanatory power of the model and to make it more parsimonious, first I abstract from the micro-process models and generate a macro-process model. Subsequently, I use the macro model to explain the political dynamics of the two implementations.

If we compare the two process diagrams (figure 5.1 and figure 6.2) that I generated using the two cases, they look exactly the same. Therefore, I collapsed the two diagrams into a single one (see figure 7.1 below). An exception is the feedback loop (the dotted line in figure 7.1) from technical inscription to emergence of frame that occurred only in the case of GovIndia when the ERP consultants learnt from their coding they had done so far that the implementation was more time and effort consuming than they expected.

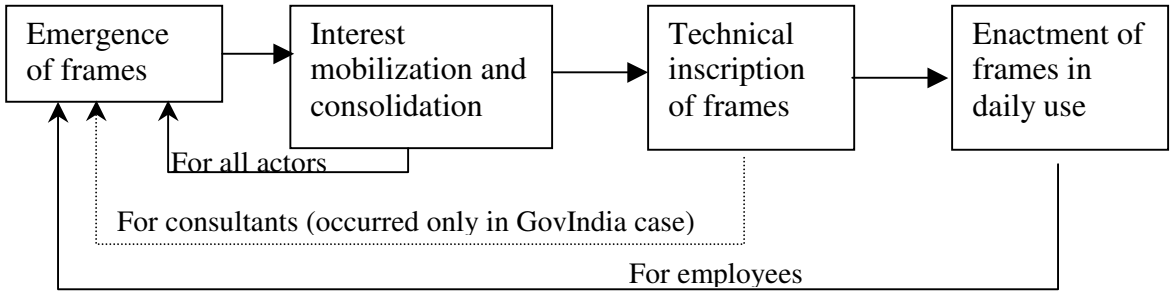

FIGURE 7.1: THE CYCLICAL POLITICAL MICRO PROCESS OF CONSTRUCTING AN IS

At this point in time, based on their (cognitive) sensemaking, the consultants framed ERP in a way that would reduce their efforts and time in order to generate a new sense of ERP technology (sensegiving) among the users. Note that in WestIndia's case there was no such incident perhaps because the consultants had more experience with ERP implementations while for Itech (GovIndian ERP consultant) the GovIndian project was their second project. It may also be due to the developmental nature of GovIndian project as opposed to an implementation of a standard stabilized software (which was the WestIndian case). We should note one more point. In my discussion about sensemaking and sensegiving, I treated sensegiving as an action while I focused exclusively on the cognitive aspect of sensemaking. One can perhaps raise an objection here since I seem to be separating sensemaking from sensegiving. Scholars are on two sides regarding this point. There are scholars who define sensemaking exclusively as a cognitive process and sensegiving as an action process (e.g. Gioia & Chittipeddi, 1991), while others (e.g. Weick, 1995; Weick et al., 2005) treat sensemaking as non-separable dualism of both cognition and action. Since I do not want to enter into this debate, I followed Gioia and Chittipeddi (1991) to define sensegiving and named the cognitive part of evolving a frame as cognitive sensemaking. Also, although the consolidation of interest includes not only the creation of legitimacy through persuasive means (e.g. sensegiving using frames) but also other means such as coercion and its legitimation, the main findings in Table 7.1 touch only the persuasive part of the consolidation process. I will take up the other parts later when I discuss the remaining common findings. In the following paragraph I abstract further from figure 7.1 using my main common findings.

If we look at table 7.1, it is clear that the main findings correspond to the three main

micro processes in figure 7.1, namely, emergence of frames, interest mobilization and consolidation, and technical inscription. Now, consider the process of political negotiation, a macro process broader than the micro processes. Political negotiation may be considered basically as an articulation of interests and preferences using structures (which is similar to technology framing since technology framing, as I argued, is a structural articulation of interests and preferences), discussion over the interest (that subsumes interest mobilization and consolidation) in order to reach a consensus, the consensus formation and conversion of the agreement into a more durable, usually textual medium (which is same as technical inscription). Therefore, the three processes put together I call negotiating technology frames. Using this concept I refine the process diagram to make it more parsimonious and simple (see figure 7.2).

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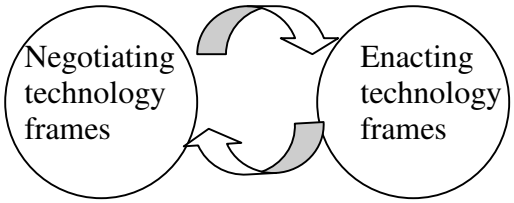

FIGURE 7.2: NEGOTIATING TECHNOLOGY FRAMES:
THE CENTRAL PROCESS IN CONSTRUCTING A WORKING IS

Using the two macro processes, I answer my research question. ***My research question was in a cross-cultural context, how do organizations create a working IS through exercise of power? The answer is: organizations create a working IS through two interactive processes, namely, negotiating technology frames and enacting technology frames***.

Now, using the two core concepts--negotiating technology frame and enacting

technology frame, I explain the political dynamics of the implementations in GovIndia and WestIndia. The ERP software is a package of standardized work practices. During the implementation, primarily to reduce their efforts, time and cost (consultant's interest), the consultants tried to retain these software-coded standard practices intact to the possible extent. Simultaneously, primarily to reduce their efforts and to preserve and/or extend their power (and organizational members' interests), organizational members tried to get the software customized by replacing ERP's standard practices with software-coded version of the organization's local practices. Assuming that the practices embody norms and interests, the mutually exclusive choice of retaining standard practices (or adopting ERP practices) vs. encoding local practices (or modifying ERP practices) to replace ERP's standard practices generated a possibility of negotiation. Negotiations occurred over the contention (retain vs. replace) primarily using technology frame as an emergent persuasive discursive resource. The actors combined this persuasion with other strategies such as coercion and exclusion of technology frames that opposed their interests in order to consolidate the interests that they had mobilized using their technology frames. These micro political strategies resulted in the convergence of technology frames (or its aspects) among certain groups and the predominance of the converged technology frames over other conflicting technology frames (or its aspects). Consequently, there emerged a narrowly shared and negotiated consensus on technology frames (or its aspects). The narrowly shared technology frames contained the evaluation of the choice (an aspect of decision-making) between adopting ERP practices and modifying ERP practices. The decision was translated into software codes. Subsequently, organizational members enacted the negotiated practices that were inscribed into the software. This led to new negotiations and enactments, and the cycle was repeated. Having illustrated the explanatory power of my core concepts and the model, below, I use the micro processes and concepts that

the model contains to analyze the political process of implementation.

This political process of framing and inscribing a technology like the ERP was a cacophony of voices, which contested, questioned, reframed, and re-inscribed the meaning and the potential use of ERP. While there were a number of times when both framing and inscription processes moved in a relatively similar direction, there were other times when there was a struggle between different frames and inscriptions of the technology. This suggests that it was a rather temporary (but not fragile as Spicer 2005 suggests) political achievement when one frame or inscription of the ERP (for example, in WestIndia and GovIndia, temporary acceptance of ERP as less customizable software) had been accepted and passed over in silence. As Foucauldian scholars such as Spicer (2005) observes, unlike what Joerges and Czarniawska (1998) note technical inscription is neither unquestioningly accepted by all actors nor is it simply the victory of one discourse over another (Munir & Phillips, 2005). Yet, unlike what the Foucauldian scholars suggest (e.g., Spicer, 2005), the political achievement of a frame at that point in time was not fragile. Instead, the encoding of the consensual meaning (achieved or manufactured through the political means) into the technology made such achievements more durable and stable. That is, given the complexity of IT, the time and budget constraints of the development/implementation projects, the usual path dependent progressive style of the development/implementation, the momentary achievements make their way into the technology and reside there nearly permanently. These momentary achievements were encoded and subsequently enacted by the users, which in turn, led to contestation of this consensual meaning (or frame), sometimes resulting in manufacturing of a new momentary consensus before the next inscription occurred. ***Thus, metaphorically, the technological artifact became a well-fitted puzzle of different pieces of momentary political achievements (and in turn frames)***

that were made more 'durable'[47] (Latour, 1991:103-131). That is, the IS was created through encoding and enactment--two processes of infusing more durability--of the various pieces of socially constructed momentary political achievements represented as "consensual" technical inscriptions, which were representations of various interests. This enhanced durability is the realist end of the social construction. Also, it is not that each actor's interests had a chance to become predominant at some point in time during the implementation. Instead, the interests of the structurally and functionally less powerful was institutionally excluded either through fiat or through coercive means. Thus, the coercive backdrop of the organization temporarily delimits what interests can contest and what interests can be inscribed into the technology.

7.2 Interweaving the secondary findings and the micro processes

Having the broad picture in place, I closely examine it focusing on two of the processes--the mobilization of interests and its consolidation, and technical inscription. Consider the process of mobilization of interests. In order to mobilize interests (both within a group such as the managers and across the groups) and to consolidate their interests, actors used technology frame, a carrier of their interest, as a discursive resource. In both cases (GovIndia and WestIndia), I had noted an interesting and a prominent way the ERP consultants used technology frame as a sensegiving discursive resource. That is discursively creating a perception that the technology by its inherent nature does not afford certain actions. Drawing on human-computer interaction literature, I proposed a concept—perceived technology non-affordance—to describe this political strategy. Thus, I argued that, it may be that ***during technology implementation, one of the prominent ways system professionals exercise their expert power over other actors through discursive means is by creating a perceived***

[47] Latour's (1991) famous saying that technology is society made durable

technology non-affordance.

Apart from the persuasive discursive strategy, in both cases, the contextually powerful actors used coercive means to consolidate their interests, and in turn, manufacture a seemingly shared consensus on technology frame between the coercing actor and the coerced. For example, in GovIndia's case, there were two such instances: 1) GovIndia's coercion of Itech that led to an apparent acceptance of GovIndia's interpretation of the ERP, and 2) GovIndian management's coercion of its office staff, particularly accounts and finance staff, using warning memos and attendance records that resulted in the coerced employees' apparent acceptance of the salience of integration (as opposed to automation) that the management wanted. Subsequently, the management legitimated its coercion using hegemonic discourses available in the immediate society. This managerial action probably expedited the apparent (or non-genuine) employee consensus with the top management's frame or its aspects. Similarly in WestIndia, although unintentionally, the elimination of the countering technology frame occurred via exclusion from negotiations of the proponents of the countering technology frame (or some aspects of technology frame) through institutional arrangements, and via creation of a perceived coercion through institutional actions such as termination of employees who incidentally opposed some aspects of the consultant-manager coalition's technology frame. Such coercive actions occurred in combination with the ongoing attempts of discursive shaping that used both technology frames (as a discursive resource) and the hegemonic meta-discourses available in the wider society. Therefore, I argued that ***during technology implementation, it is likely that actors use coercive means either as a last resort or in combination with persuasive discursive means to manufacture a seemingly widely shared consensus on technology frame.*** Drawing upon the social construction

literature, I proposed the notion of ***institutional closure*** to denote such consensus manufactured through institutional means. The social construction of technology literature uses a notion of closure to indicate the emergent-shared consensus on technology frame (defining technology frame more broadly). Further, the literature suggests two modes of creating such "closures", through cognitive means (called problem redefinition closure) and rhetoric means (called rhetoric closure). To this repository, I add a third means of creating closure, an institutional means.

So far our discussions were around technology frames-- the main discursive resource that the actors used to mobilize interests. But, as I mentioned above and had noted in my case analyses, in both cases, to consolidate interests, the actors supplemented this discursive resource with other discursive resources such as the hegemonic meta-discourses available in the wider society. For example, in the case of GovIndia, the management used two hegemonic discourses: 1) the opposition to modern technology (as the management interpreted it) is a destructive belligerent TU stand, and 2) it is the management's right to increase employee monitoring while it is the employee's duty to obey the command of the management. Similarly, in WestIndia, the manager-consultant coalition used the hegemonic discourse in the wider society that the so-called "Western" temporal norms are more favorable than the so-called "traditional" temporal norms. These two hegemonic discourses do not use technology frames as discursive means. Therefore, I argued that ***during technology implementation, in addition to technology frame, actors may use the hegemonic discourses available in the immediate society in order to consolidate their interest, and in turn, create a shared consensus***.

A powerful meta-discourse that the WestIndian management used was identity

discourse. For example, in my analysis, I noted how the managers used the socially desirable professional identity of "software engineer" to create an equivalent identity "ERP enabled employee," tying the managers' technology frames of delay reducer and enabling discipliner to the meta-discourses in the society about the "software engineer" identity. Thus, the managers used technology frames in combination with hegemonic meta-discourses in the wider society to not only technically inscribe their interest into the software but also produce a new identity, an ERP enabled employee who is equivalent to software engineer. I have also shown that the political dynamics of this identity formation influenced the technical inscription, for example, the acceptance of the ERP's global temporal norms such as time boundedness, which was taken as the hallmark of the software engineer identity. Therefore, I argued that ***ERP implementation may be seen as not only a creation of an information system but also a co-creation of a new worker identity, or in other words, ERP implementation is a co-evolution of an information system and a worker-user.***

So far we have considered interest mobilization and consolidation. In this paragraph, I focus on technical inscription, the next sequential process. In both cases, we have seen that the negotiators inscribed their interests into the software program. For example, in GovIndia, in order to reduce peer and superior monitorability, both plant staff and office staff cut down the connections (or the links) between their data and other division's data, which resulted in a weak information integrator, a functionally inferior technology. Similarly, in WestIndia, I have shown how the managers' choice of encoding certain local practices (while not others) into the ERP software was significantly based on political grounds than on alternative grounds such as functional considerations. The managers' choice resulted in significant modification of the standard ERP creating a cross-cultural, specifically cross--temporal IS. Thus, in both

cases the political interests of the negotiators directly and significantly affected the content (e.g., the software codes) or the body of the ERP software, a technological artifact. Therefore, I argued that ***in certain context of technology implementation, beyond other considerations such as functional utility, the negotiators' political interest may significantly and directly influence the content or body of technological artifacts***. A step further, in the WestIndian case, the managers modified the software in order to make it a political means to weaken the strength of anticipated worker strikes. Thus, WestIndian case ***illustrates how technology becomes a politics by other means.*** In making technology a political weapon, the managers not only preserved but also extended their control (in turn, power) over labor. The managers realized this political interest through getting their interest translated into software codes that even changed the local practices in subtle ways (for example subtle changes in return material authorization in the case of material diversion practice). Thus, in a way, these modifications were a material realization of the managers' political interests. Therefore, I argued that, ***in certain contexts of technology implementation, technological artifact may become a material realization or materialization of the political interests of the negotiators involved in technology modification.***

In WestIndia's case, this also means that the cultural context (e.g., the local temporal norms that were in conflict with the ERP's global temporal norms) of the implementing organization (e.g. WestIndia) shaped the technological artifact (e.g., the final software) through the political actions—most significantly shifting of technology frames--of the actors involved directly (e.g., the mangers) or indirectly (e.g., the supervisors) in the negotiations about the modification of the technology. The powerful actor (the managers) made the choice of which particular norms affected the technology. They chose the norms that either preserved or advanced their political

interest. In this choice, functional (e.g., tightening the integration as opposed to weakening the integration) and cultural considerations (e.g. preservation of the habituated local practices) were secondary to political considerations. Therefore, I suggested that ***in cross-cultural context of technology implementation, cultural context might shape technological artifacts through the actions that would realize the political interest of the negotiators***.

7.3 Contributions to research and practice

This section is organized into two parts that together forms the contributions of this study: methodological and theoretical, in other words contributions to research, and practical, in other words contributions to practice.

7.3.1 Methodological contribution

In this study, I used grounded theory method to inductively develop a process model that parsimoniously explains the political dynamics of creating a cross-cultural IS in two South Indian manufacturing organizations. I built the process model using the core concept, negotiating technology frames. In addition, the inductive approach also helped generate two more concepts, technology non-affordance and institutional closure, that explain the fine-grained details of the process model. Deviating from the usual style of grounded theory application, in my case analysis I used one feature of qualitative case study approach, testing a hypothesis. For example, in WestIndian case, I analyzed alternative plausible explanations to test my hypothesis of negotiators' political interests as the primary motivation for a modification decision. This I believe has increased the rigor of my argument and strengthened the overall model. Thus, following Glaser (1998), I exhibited a methodological flexibility by not sticking with the dictums of grounded theory. Also, unlike in many grounded theory studies that

present just the empirical data and the emergence of the theory showing their relationship but leaving the historicity of the empirical data out, I situated my data in its historical context. I believe that such situating, to some extent, wards off the criticism against grounded theory-in-use for its decontextualization of empirical data (see Charmaz, 2006; Glaser, 2002). Thus, methodologically, this study illustrates how we can build-in some features of the qualitative case study approach into the application of grounded theory in a fruitful manner.

7.3.2 Theoretical contribution

My study contributes to four streams of research. In organization studies, my study builds on the research on sociopolitical construction of IT in organizations. In IS studies, my study contributes to the IS implementation studies that use technology frame and that focus on the politics of IS implementation in organizations. In ERP studies (interdisciplinary) my study joins the research on sociopolitical construction of ERP. I also contribute to the social construction of technology (SCOT) literature.

7.3.2.1 Contribution to organization studies

As I mentioned in the literature review, a growing number of studies on technology implementation has shown that discourse shapes how actors may understand and use a new technology (Bloomfield & Best, 1992; Bloomfield & Coombs, 1992; Doolin, 2003, Hayes & Walsham, 2000; Heracleous & Barrett, 2001; Maguire, 2004; Munir, 2005; Munir & Phillips, 2005; Spicer, 2005). I build on these studies to show how actors use technology frame as a discursive resource to inscribe their political interest. While this stream of studies examine exclusively the politics involved in creating a consensus on the should-be-use and the should-be-meaning of technology, or in other words, the 'politics of technical inscription' (Spicer, 2005) which is prospective in its

nature, my study augments this stream of research by examining the influence of politics on the retrospective sensemaking (Weick, 1979a,b; 1995), for example the framing of the evolving meaning (not potential meaning) of ERP and its felt-use (not potential use). My study shows that it is important to understand this process of framing which is under researched in organizational studies (Van de ven, 2005), since it is framing that shapes the subsequent politics of technical inscription. I also identify an additional intermediate process –enactment of frame--that influences the content of the subsequent discourses through frames. The process of enactment captures the role of 'strength of test' that Grant et al. (2006) suggest as an enabler of counter discourse by the structurally and functionally less powerful users of technology.

In short, the extant organizational studies on politics of technology implementation generally focus on the political process of technical inscription (Spicer, 2005). The upstream activity of emergence of frames, which is a retrospective sensemaking process (see figure 7.1), as well as the downstream activity of frame enactment is missing from this stream of studies. In turn, how political dynamics links frame emergence with the politics of technical inscription, and in turn, with frame enactment is also absent from this literature. The implication of this missing down stream and upstream activities is lack of a holistic picture. By developing a new concept—negotiating technology frames—and a process framework to investigate the linking political dynamics, my study provides a theoretical tool to examine the political process of IT implementation holistically. Further, my study illustrates the explanatory power of the proposed theoretical tool by explaining parsimoniously the political dynamics of ERP implementation in two radically different contexts. The empirical examination in two radically different contexts also is a contribution of my study. As I have noted in the literature review, in organization studies of the sociopolitical

construction of IT implementations, studies that simultaneously examine IT implementation in radically different contexts is rare. The context of my study helps me make some other contributions too, that I discuss later.

Years back scholars have called for brining concepts from sociology of technology literature and IS literature into organization studies noting the lack of such efforts (see Orlikowski & Barley, 2001). Recently, there are some attempts in this direction (e.g., Spicer, 2005; Fayard & Weeks, 2007). My study pushes these efforts further in the following way. By developing the new concept and the process model that I described above, I bring in concepts and a theoretical frame from the social construction of technology literature and the IS literature into organization studies of IT implementation.

As I have noted in the literature review, historically, the research on sociopolitical construction of IT implementation has focused exclusively on one modality of exercise of power—discursive/rhetoric persuasion, though they implicitly acknowledge other modalities of power such as coercion. For instance, studies that highlight the role of coercion and its interaction with persuasion are rare. The exclusive focus on persuasion has generated a less nuanced picture of political dynamics. More importantly, such studies miss the opportunity to raise ethical questions on the coercive modus operandi of IT implementations that follow typical managerial instrumentalism (Sawyer, 2001). By highlighting the role of coercion and its interaction with persuasion (for example legitimated coercion) and raising the related ethical concerns, my study addresses this paucity. More importantly, the significant role of coercion in creating a sharedness of sensemaking in terms of a consensus on meaning (s) and use(s) of technology questions the assumption of a

shared sensemaking (shared across different actor groups). This assumption of sharedness is pervasive in the literature on organizational sesnemaking (Weick et al., 2005).

How system professionals such as ERP consultants exercise their expert power over users has been a sustained question in the literature on politics of IT implementations both in IS field and organization studies field (see Bloomfield & Danielle, 1995; Howcroft & Trauth, 2006; Jasperson et al., 2002; Markus & Bjorn-Anderson, 1986). Adding to the studies that answer this question (e.g., Bloomfield & Danielle, 1995; Howcroft & Trauth 2006; Markus & Bjorn-Anderson, 1986), my case study generates a rich description of the political strategies that the consultants may use during ERP implementation, the users' response to it, and the effect of this interaction (see figure 5.2 and figure 6.2). But beyond this description, I develop a concept—*perceived technology non-affordance*--that helps explain how system professionals exercise their expert power over the users through discursive means.

Through the WestIndian case study, my research also addresses an empirical question of how organizations create a working IS when the system being implemented has in-built cultural assumptions in conflict with that of the organization—an under-researched theme in organizational studies and information systems studies. I focus on an oft-neglected element of organizational culture, temporal norms (Ancona, Goodman, Lawrence, 2001; Ancona, Okhyusen, Perlow, 2001; Trice, 1993), and the political strategies that organizations employ to create a working IS (Jasperson et al., 2002; Spicer, 2005; Wagner et al., 2006). The studies on the politics of implementation and modification of IS have focused less on temporal aspects. Conversely, the studies that discuss changes in temporal aspects during IS

modification or implementation do not examine the associated political aspects (Kandathil, 2009). This lack of dialogue situates the contribution of my study. Apart from this theoretical interest, this contribution of my study has practical importance too. During trans-national implementation with its Western origin, design, and the embodiment of Western work practices, ERP is bound to encounter non-Western work practices (Davison, 2002; Martinsons, 2004) that may have different temporal norms and assumptions. Therefore, from a practical viewpoint, it is important to understand how an organization resolves the conflicts between the temporality embedded in the standard off-the-shelf technology and the organizations' work practices. My study shows that actors resolve this conflict primarily through political strategies that include attempts to discursively shape users' temporal norms, and through exclusion of opposing views through coercive means. This micro politics creates an apparent consensus on the modification of the ERP software, and in turn, leads to embedding the temporal asymmetry (e.g., the mix of global temporal norms and local temporal norms that are in conflict) into the resulting technological artifact, the final ERP software.

7.3.2.2 Contribution to information systems studies

Information systems literature defines and employs technological frame as a cognitive device that actors use for their individual as well as collective sensemaking (e.g. Orlikowski & Gash, 1994; Davidson, 2006). In addition, my study illustrates that actors use technology frames as emergent discursive resource. Therefore, I propose a re-conceptualization of technology frame as a simultaneous cognitive device and political device in its use. As both my case studies illustrate, such a re-conceptualization will increase the explanatory power of the notion of technology frame. For example, my study illustrates how the use of technology frame as an

emergent discursive resource facilitates the political actions that links cognitive-discursive generation of frames (emergence of frame in figure 7.1) and the process of technical inscription. Moreover, to the extent sensemaking is simultaneously a cognition and an action (Weick et al., 2005), the IS conceptualization of technology frame as a sensemaking device and its exclusive focus on cognitive use of technology frame, for example, the examination of generation of shared consensus using frames as a cognitive congruence creating process (e.g., Orlikowski & Gash, 1994), creates a less holistic picture. Such studies miss an important dimension of sensemaking—the political action (Weick et al., 2005). Similar is the issue when we use the definition of technology frame as a cognitive device to investigate the political dynamics of technology frame (e.g. Davidson, 2002; Yeow & Sia, 2008). In such examinations, the structural shift of technology frames becomes an outcome of actors' political action (e.g., Davidson, 2002); neither such frame shift nor the content formation of frames is treated as a means or medium of political action. For such understanding of how frames are a medium of political actions and its implications, we need to re-conceptualize technology frames as political device.

IS studies that employ technology frame as a theoretical lens usually treat technology frame as an outcome. The exclusive focus on outcome has black-boxed the notion limiting its explanatory power (Davidson, 2006). An exception is the Davidson (2002) work that examines the cognitive and political process of shifting salience of technology frames and the resultant drift in actors' understanding about system requirements for an IS implementation. Another exception is the Yeow and Sia (2008) work that illustrates how actors' discursive strategies resulted in the non-congruence of technology frames. I push these works further by showing how technology frame itself is both a medium (as opposed to an outcome as in Davidson's work and Yeow's

and Sia's work) and an outcome of actors' political strategies. By doing this, I also answer the recent call in the framing literature on political negotiations that exhorts scholars to examine the political process of framing as opposed to treating frames as a result of political actions (Carragee & Roefs, 2004; Dewulf, Gray, Putnam, Lewicki, Aarts, Bouwen, & van Woerkum, 2009).

The politics of identity construction is central to the critical studies on management of organizations (Alvesson &Willmott, 2003) that include management of technology implementation. The critical perspective is a predominant approach in IS studies (Jasperson et al., 2002). Yet, critical IS studies have limited focus on the issues of worker identity production. This relative neglect has provoked scholars to criticize critical IS studies for its 'soft criticality' (e.g., Mitev, 2006). In WestIndian case study, I show how the use of meta-discourses in the wider society in combination with the use of technology frame as a discursive resource co-creates IS and a new worker identity—ERP enabled worker. I also had argued that one of the predominant underlying processes that the managers used to create consensus on their technology frame was identity construction. Thus, I highlighted the co-production of a worker identity and an IS that is expected to sustain and reproduce that worker identity.

7.3.2.3 Contribution to ERP studies

As my literature review shows, scholars from different fields have engaged in examining the implementation of ERP within organizations. Still, majority of ERP studies are done from a system engineering perspective that focuses on critical success factors of the implementation. This has created a huge imbalance in the ERP literature (Wagner et al., 2006). As my literature review shows, there is a growing exception that focuses on the sociopolitical construction of ERP (see Pollock & William, 2009).

My study joins this stream of research. Similar to what I mentioned regarding the studies on sociopolitical construction of IT implementations in organizations, ERP studies that focus on sociopolitical construction also have an exclusive focus on persuasive discourses which has generated a less nuanced picture. By focusing on persuasion, coercion, and its interaction, my study generates a more nuanced understanding of the sociopolitical construction of ERP implementation. In addition to the exclusive focus on persuasion, ERP researchers have noted the lack of an integrative process model in ERP studies to examine the sociopolitical construction of ERP (Wagner et al., 2006). By proposing a process model that integrates both upstream and downstream activities of the political strategies to create a shared consensus on the meaning and use of ERP, I address this paucity.

Most of the published ERP studies use a single organization case study. Given the complex nature of ERP implementation and its spread over multiple phases and periods, recently (e.g. Pollock, 2009; Pollock & Williams, 2009) IS scholars have called for investigating multiple cases that span over multiple periods and phases. Taking two radically different ERP implementations that spans over multi-period and multi-phases, this study answers that call.

7.3.2.3 Contribution to social construction of technology studies

The social construction of technology (SCOT) framework has been rarely used to study introduction of IT in an organization. This study takes care of that neglect. More importantly, the SCOT literature in general has been criticized for its overlook of power relations that emerge during technology development and implementation (see Winner, 1993; Pinch, 1996; Wacjman, 2000). Also, the SCOT framework discounts, in favor of persuasion (social influence), the role of coercion (power dimension) in

constructing a social consensus that the technology is "working". By highlighting the role of coercion in constructing the "shared" consensus on the meaning and use of ERP technology, this study address the above concerns. In doing this, I generated a concept—institutional closure—that helps explain how actors use institutional coercive means to manufacture a seemingly shared consensus. I argued that it is the combination of institutional means with rhetoric and cognitive means—the two means that SCOT literature identifies--that leads to "shared" consensus on or the closure of the meaning attributed to technology. The existence of institutional closure raises doubts about the genuineness and breadth of the sharedness (i.e., how widely and how genuinely the frame is shared) of technology frame that the technology implementation literature usually suggests.

7.3.3 Contributions to the practice

Although increasingly and in massive way multinational organizations, especially Western multinational organizations, have been implementing ERP in their subsidiary units in the emerging economies (Huang & Palvia, 2001), especially in India (Gunasekaran, 2008). As I mentioned in the literature review, systematic academic study on ERP implementations in emerging economies or the so-called developing countries is scarce (Martinsons, 2004). Also, ERP studies have limited focus on ERP implementations in Small and Medium Enterprise (SME) sector, though such implementation is an increasing phenomenon (Chen et al., 2008). Equally rare is the study on ERP implementation in government organizations, especially in emerging economies (Singla, 2005). On these grounds, my study is a unique attempt that shows to practitioners as well as academicians what may occur during ERP implementations in such contexts. Furthermore, one of my case studies—GovIndia—is of special significance since in that case, the ERP implementation was turned into an ERP

development, and the developed product is now increasingly sold out to other countries including Western countries. Thus, it shows the messy historical development of a "global" software product that originated unexpectedly in the politics of a local government organization. As we have seen, to a large extent some of the points I mentioned in this paragraph (exclusive focus on persuasion, lack of process model, and focus on single case study) are equally applicable to studies that focus on sociopolitical construction of IT implementation in general.

Finally, there is an issue of organizational ethic. While ERP implementation affords increased monitorability, the group that could be most affected (e.g., group 4 and the operators in WestIndian case) is usually excluded from negotiations (Sawyer, 2001). The exclusion from participation, on one hand, creates an information asymmetry that may lead to inadvertent speculations, as it occurred in the case of group 4 members. On the other hand, the exclusion from participation and the intentional discursive domination severely limit the possibility of negotiation about the close monitoring of employees before it occurs. Thus, in effect, it leads to an increased monitoring of employees without negotiating this issue with them before hand. This should be an ethical concern for practitioners as well as academicians.

7.4 Limitations and further research

Although the unique context of my study enables me to make a number of theoretical and practical contributions, it may also limit the generalizability of the findings of this study. For example, the institutional closure and perceived technology non-affordance may not occur or play a significant role in other contexts. However, I tried to overcome this limitation through multiple levels of abstraction from the empirical data. Still, my findings may be confined to implementation of ERP or perhaps

implementation of configurable technologies such as ERP. This limitation brings us to the possibility of further research.

In order to understand and expand the explanatory power of the model and the concepts I generated in this study, this study should be repeated in other contexts, especially in Western contexts and larger corporations. Also, my study does not focus on both the upstream (for example, the vendor activities before ERP implementation) and the downstream (for example, the repeated use of the full-fledged ERP system) side of ERP implementation. Examination of these activities will help expand the process model to a historical model that captures the 'complete biography' of ERP technology (Pollock & Williams, 2009). It will also help to understand more fully the implications of the activities during ERP implementation (from starting of choice of the ERP system to its initial use) for working life in organizations. Also, although my study showed how worker identity production occurs during ERP implementation, it did not examine the intricacies of such politics. Drawing on the vast literature on identity construction and subjectivity, it may be possible to get into such intricacies.

I have used technology frame as the theoretical lens for analysis. Another possible theoretical lens is institutional logics. Given that technology frame can embed logics of action (for example, task efficiency as the temporal logic of action that governed the technology frame of ERP as a delay reducer, and ERP as a discipline enabling agent) and that such logics of action are usually institutionalized within a community, (for example the ERP consultants), it may be possible to consider technology frame as a structural carrier of 'institutional logics' (Friedland & Alford, 1991). Such an approach could bring out an interesting point that contradictory institutionalized temporal logics, for example, the temporal logics of efficiency that suggests a

temporal rigidity such as time bound action and schedule adherence versus the contrasting temporal logics of flexibility that suggest a temporal flexibility such as lack of time bound action and deviation from schedules, are co-mingled and encoded in the process of institutional change. [48]The point that actors' co-mingle contradictory institutional logics that results in institutional change point will be interesting since the much of the neo-institutional literature that use institutional logics to examine institutional change posits or argues that institutional change occurs when one logic wins over other competing logics (example, Seo & Creed, 2002; Suddaby & Greenwood, 2005; for a review, see Thornton & Ocasio, 2008).

[48] I am indebted to Prof. Susan Newell for this point.

APPENDIX 6.1

THE TUSSLE OVER PERFORMANCE APPRAISAL SYSTEM IN WESTINDIA

During the initial years after the inception of WestIndia (i.e. 1996-1999), there was no formal Performance Appraisal System (PAS) for the line workers including machine operators. The operators complained about the lack of transparency in the promotion and production bonus (arguably based on job performance). As the grievance increased, the management instituted a formal PAS in 2003. Until the PAS was instituted there were frequent frictions between the Management represented by the Business manager and the non-managerial employees, especially over issue of salary increases, promotions, and bonuses. Once the PAS was instituted, the operators complained that the PAS was too subjective and non-transparent to them. Thus, again there were frictions between the management and the employees. There were ripples of these frequent frictions on the shopfloor. For example, there were frequent clashes between supervisors and operators (line workers) over performance appraisal. The operators used to accuse supervisors' and engineers of subjective assessment and point to the subjective criteria in the appraisal form. It was said (and line workers agree) that the middle managers had improved the objectivity of the PAS by replacing some subjective criteria such as intelligence with objective criteria such as number of defective products produced per month. Still, there had been issues in assigning the reasons for failure to workmanship vs. machine problems vs. material problem. Absenteeism of the line workers had been another frequent headache for the management. The non-managerial employees as well as the managerial employees considered absenteeism mostly as an expression of employee resistance to the management policies. Before the Norwegian take-over, some of the workers had performed a go-slow strike to show their dissatisfaction over not getting salary hike and production bonus.

When the new MD took over, he called a meeting of all non-managerial employees and promised them his cooperation and a salary hike. In return, he asked for increase in production. The production shot up by 40% (Company document, 2007) and when ERP implementation just began (in August 2007), the line workers got a 10% salary hike. Subsequently, in November 2007, supervisors got a 40% salary hike. The line-workers had complained about the significant salary difference (and the percentage of salary hike)—2 times--between the line workers and the supervisors (having same number of years of experience). Now, the gap increased further and this, in turn, increased line workers' grievance, which finally resulted in strikes and lay offs. Thus, during ERP implementation, unlike GovtIndia's "peaceful labor-management relationship" the labor relation environment in WestIndia was "explosive", as one engineer put it.

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